

# AKAI

# SERVICE MANUAL

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**Model:**

**LCT2715**

Safety Instructions  
Production specification.  
Block Diagram  
Circuit Diagram  
Disassembly  
Pin Descriptions  
LCD Panel specification  
Exploded View Diagram  
Spare parts list  
V-chip password and software upgrade

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This manual is the latest at the time of printing, and does not include the modification which may be made after the printing, by the constant improvement of product.

## I. Safety Instructions



### CAUTION

**RISK OF ELECTRIC SHOCK  
DO NOT OPEN**



**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.**



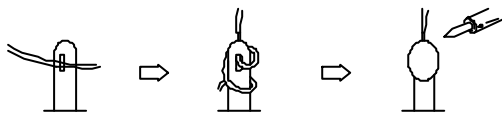
The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

### PRECAUTIONS DURING SERVICING

1. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, tuner units, antenna selection switches, RF cables, noise-blocking capacitors, noise-blocking filters, etc.
2. Use specified internal Wiring. Note especially:
  - 1) Wires covered with PVC tubing
  - 2) Double insulated wires
  - 3) High voltage leads
3. Use specified insulating materials for hazardous live parts. Note especially:
  - 1) Insulating Tape
  - 2) PVC tubing
  - 3) Spacers (insulating barriers)
  - 4) Insulating sheets for transistors
  - 5) Plastic screws for fixing micro switches
4. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



5. Make sure that wires do not contact heat generating parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
6. Check if replaced wires do not contact sharply edged or pointed parts.
7. Make sure that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

### MAKE YOUR CONTRIBUTION TO PROTECT THE ENVIRONMENT

Used batteries with the ISO symbol for recycling as well as small accumulators (rechargeable batteries), mini-batteries (cells) and starter batteries should not be thrown into the garbage can. Please leave them at an appropriate depot.



### WARNING:

Before servicing this TV receiver, read the X-RAY RADIATION PRECAUTION, SAFETY INSTRUCTION and PRODUCT SAFETY NOTICE.

### X-RAY RADIATION PRECAUTION

1. Excessively high can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The normal value of the high voltage of this TV receiver is 27 KV at zero beam current (minimum brightness). The high voltage must not exceed 30 KV under any circumstances. Each time when a receiver requires servicing, the high voltage should be checked. The reading of the high voltage is recommended to be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type as specified in the parts list.
3. Some parts in this TV receiver have special safety related characteristics for X-RADIATION protection. For continued safety, the parts replacement should be under taken only after referring the PRODUCT SAFETY NOTICE.

### SAFETY INSTRUCTION

The service should not be attempted by anyone unfamiliar with the necessary instructions on this TV receiver. The following are the necessary instructions to be observed before servicing.

1. An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.
2. Comply with all caution and safety related provided on the back of the cabinet, inside the cabinet, on the chassis or picture tube.
3. To avoid a shock hazard, always discharge the picture tube's anode to the chassis ground before removing the anode cap.

4. Completely discharge the high potential voltage of the picture tube before handling. The picture tube is a vacuum and if broken, the glass will explode.
5. When replacing a MAIN PCB in the cabinet, always be certain that all protective are installed properly such as control knobs, adjustment covers or shields, barriers, isolation resistor networks etc.
6. When servicing is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area.
7. Keep wires away from high voltage or high temperature components.
8. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screwheads, metal overlay, control shafts, etc., to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly to the AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5K ohms volt sensitivity or more in the following manner.

Connect a 1.5K ohm 10 watt resistor paralleled by a 0.15 $\mu$ F AC type capacitor, between a good earth ground (water pipe, conductor etc.,) and the exposed metallic parts, one at a time.


Measure the AC voltage across the combination of the 1.5K ohm resistor and 0.15  $\mu$ F capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part.

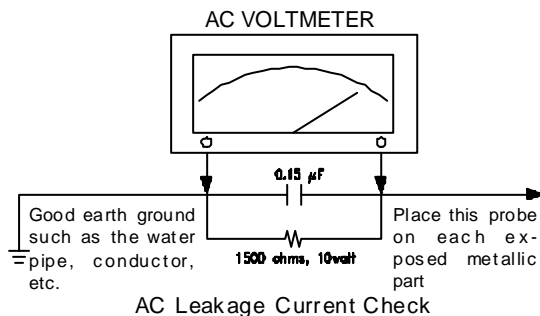
The measured voltage must not exceed 0.3V RMS.

This corresponds to 0.5mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch "ON". The resistance should be more than 6M ohms.

## PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this TV receiver have special safety-related characteristics. These characteristics are offer passed unnoticed by visual spection and the protection afforded by them cannot necessarily be obtained by using replacement components rates for a higher voltage, wattage, etc. The replacement parts which have these special safety characteristics are identified by  marks on the schematic diagram and on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire, X-RAY RADIATION or other hazards.



# ***KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE***

## **Product Specification**

**Reference No.** : LC27HAB001  
**Revision** : 0  
**Date** : 2005.08.1  
**Page** : P.1 of 8

**Model No.** : LC27HAB  
**Customer Model No.** : LCT2715  
**Design Code** : LC26HABCUSXM1-A03

**BOM No.** : LC26HABCUSXM1-A03

**Artwork Ass'y No.** : 797-L26AB01-01

**Description** : AKAL LCD TV 26" NTSC AC100V-240 V AC USA

**Checked By:** **Electronic Engineer** \_\_\_\_\_

**Mechanical Engineer** \_\_\_\_\_

**Approved By:** **Engineering Manager** \_\_\_\_\_

**Approved By:** **PM Department Head** \_\_\_\_\_

<b>DOC Rev NO.</b>	<b>The Latest Revision Details</b>	<b>DATE</b>
<b>0</b>	<b>Initial Release</b>	

# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

Reference No : LC27HAB001  
Revision : 0  
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## General Description

<b>1. Main features</b>	
Production Description	AKAL LCD TV 27" NTSC AC100V-240VAC USA
Panel Supplier and Model	CHIMEI V270W1-L03
Chips Solution	MK8205
Market	USA
<b>1.1 VIDEO SECTION</b>	
Display size	27"/16:9
Display Resolution	1280×720
Pixel Pitch	0.1555mm×0.4665mm
Peak Brightness	550(nits)
Contract Ratio	600:1, Typical (1/100 White Window, Dark Room)
View Angle	Hor. And Vert. ≥170 degree
Color Deeps	16.7M Color
PC Resolution Supporting	VGA, SVGA, XGA, WXGA
HDTV Compatible	480p, 576P, 720p, 1080i
Progressive Scanning	Yes
Film Mode Pull Down	Yes
"GAMMA" Correction	Yes
Color Temperature Control	Yes
Comb Filter	Yes
Second De-interlace for Sub picture	No
Wide Mode	Full, Fill Aspect Ratio, Nonliner, LB to 16:9, LB subtitles to 16:9 or Anamorphic
TV System	NTSC M
Dual Tuner System	No
AV Input Color System	PAL /NTSC
PIP	Basic mode (video on graphic mode, resolution ≥1024×768)
<b>1.2 AUDIO SECTION</b>	
Audio Output Power	6W×2 Max.(8 ohm)
Sound Effect	NO
Tone Control	Yes
1.3 Input Terminals	Analog-RGB Input (D-Sub 15 Pin Type) ×1 D-Sub 9 Pin (RS-233 Input ) ×1 Antenna Input (F Type) ×1 S-Video Input (Mini Din 4Pin) ×1 CVBS Input (RCA Type) ×1 Y / Pb / Pr, Y / Cb / Cr (RCA Type) ×2 Stereo Audio Input (RCA Type) ×3 (3.5mm Phone Type) ×1
1.4 Output Terminals	Audio Output (RCA Type) ×1
<b>1.5 Others</b>	
Closed Caption / V-Chip	Yes
Teletext	No
OSD Language	English, Français, Español

# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

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Stereo Decode	MTS with SAP
Power Rating	AC 100-240V, 50/60Hz
Power Consumption	200W

## 1.6 Support the Signal Mode

This machine can support the different from VGA signal mode in 19 kinds

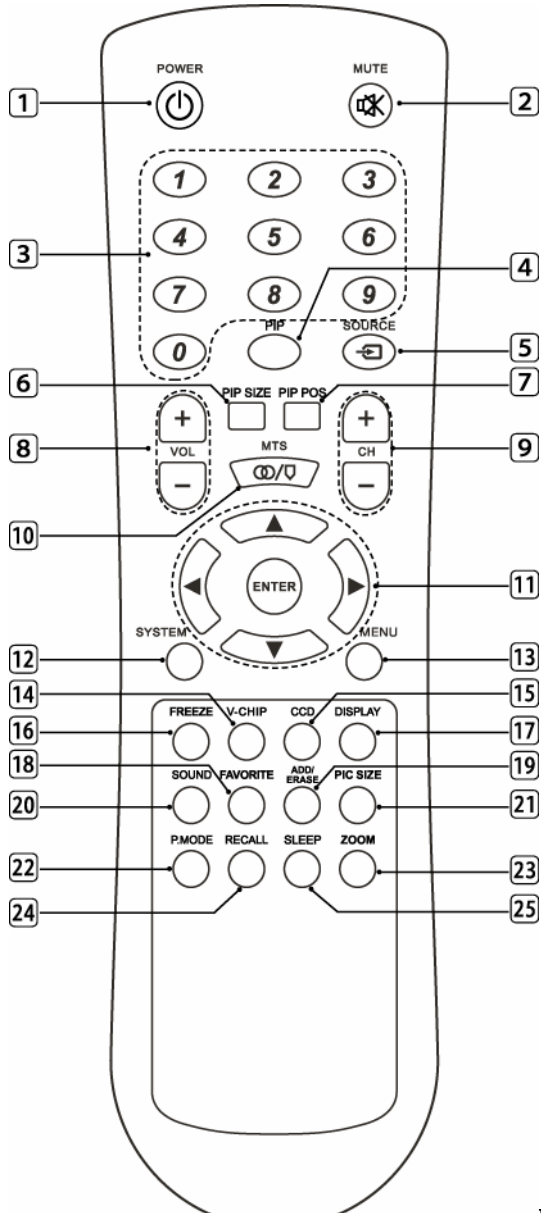
No	Resolution	Horizontal Frequency(Hz)	Vertical Frequency(KHz)	Dot Clock Frequency(MHz)
1)	640×480	31.50	60.00	25.18
2)	640×480	35.00	67.00	30.24
3)	640×480	37.50	75.00	31.50
4)	640×480	37.86	72.81	31.50
5)	720×400	31.47	70.08	36.00
6)	800×600	35.16	56.25	36.00
7)	800×600	37.90	60.32	40.00
8)	800×600	46.90	75.00	49.50
9)	800×600	48.08	72.19	50.00
10)	832×624	49.00	75.00	57.27
11)	1024×768	48.40	60.00	65.00
12)	1024×768	56.50	70.00	75.00
13)	1024×768	60.00	75.00	78.75
14)	1152×864	63.86	70.02	94.51
15)	1152×864	67.52	75.02	108.03
16)	1280×960	60.02	60.02	108.04
17)	1280×1024	64.00	60.01	108.00

## 1.7 HDTV Mode (YPbPr)

No	Resolution	Horizontal Frequency(KHz)	Vertical Frequency(Hz)	Dot Clock Frequency(MHz)
1)	480i	15.734	59.94	13.50
2)	480p(720×480)	31.468	59.94	27.00
3)	576p(720×576)	31.25	50.00	27.00
4)	720p(1280×720)	37.50	50.00	74.25
5)	720p(1280×720)	45.00	60.00	74.25
6)	1080i(1920×1080)	33.75	60.00	74.25

# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

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2. LCD local control button	Main power : push switch Channel +/- volume up/down menu input. standby : soft touch
3. Led indicators :	Power on: Green Standby: Red
4. OSD language	English, Français, Español
5. OSD	Full on screen display
6. Remote control unit Customer Remote Code: 609F(NEC)	 <p>1 POWER button  2 MUTE button  3 0-9 DIGITAL button  4 PIP button  5 SOURCE button  6 PIP SIZE button  7 PIP POS button  8 VOL +/- button  9 CH +/- button  10 MTS button  11 UP/DOWN,LEFT/RIGHT ENTER buttons  12 SYSTEM button  13 MENU button  14 V-CHIP button  15 CCD button  16 FREEZE button  17 DISPLAY buttons  18 FAVORITE button  19 ADD/ERASE buttons  20 SOUND button  21 PIC SIZE button  22 P.MODE button  23 ZOOM button  24 RECALL button  25 SLEEP button</p> <p>E7501-051001</p>
7. Safety standard	UL/CSA/cUL
8. EMC standard	15 Parts of the FCC rules,CLASS B
9. Performance standard	LCD-TV Standard
10. Accessories	Battery 2pcs User Manual 1pcs AC Cable 1pcs Remote Control 1pcs The Accessories box 1pcs

# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

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## Technical Data

1. Chassis		MICO
2. Power supply	TV	AC 100-240 V, 50/60Hz
	Remote controller	Battery 3V (UM-4/R03/AAA×2)
3. TV system	RF input	NTSC M
	Video input	PAL/NTSC 3.58/NTSC 4.43
4. Receiving channels	TV	VHF-L : 2~6CH VHF-H : 7~13CH UHF : 14~69CH
	CATV	1~125CH
5. Intermediate frequencies	Picture	45.75MHz
6. Scanning	Horizontal (Hz)	15625/15750
	Vertical (Hz)	50/60
7. AC plug		UL Plug
8. Panel		V270W1-L03
9. Speaker	Internal	8 ohm 10W (max) ×2
10. Operating temperature	Fulfill all specifications	15°C ~ 30°C
	Accept picture/sound reproduction	5°C ~ 33°C
11. Operating relative humidity	Fulfill all specifications	45% ~ 75%
	Accept picture/sound reproduction	20% ~ 80%
12. Electrical & optical specification		See the attachment 1.
13. Circuit diagram drawing No.		LC26HAB
15. Cabinet		
16. Cabinet color		
17. Packing		1 set per
18. Container stuffing method		RD/05/P/LC26HAB/CSI/02 REV: 01
19. Dimension (mm) (No packing)	LCD-TV	883(W) × 468(H) × 110(D)mm (w/o Stand)
		883(W) × 532(H) × 250(D)mm (with Stand)
	Remote control unit	183(L) × 53(W) × 28(T)mm
20. Net weight	LCD-TV	14.1Kg (with Stand) approx.
	Remote controller	70g (approx.)
21. Cell Defect		Subject to Panel supplier specification



# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

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## Attachment 1: Electrical & Optical Specification

No.	Items		Instruction		Typical	Limit	Unit
1	Video sensitivity		For 30dB S/N		44	$\leq 51$	dBuV
2	FM sound sensitivity		For 30dB S/N		21	$\leq 35$	dBuV
3	Color sensitivity		For RF transmission		37	$\leq 40$	dBuV
4	CCD sensitivity		TV screen refreshes 40 times number of mistakes $\leq 8$		43	$\leq 50$	dBuV
5	Minimum NICAM threshold		Without crackline noise		N/A	N/A	dBuV
6	Stereo Channel Separation		BTSC.		18	$\geq 15$	dB
7	AGC static characteristic		Accept. Picture/Sound repr.		90	$\geq 90$	dBuV
8	Selectivity		Adjacent sound carrier		30	$\geq 28$	dB
			Below adjacent sound carrier		30	$\geq 30$	
			Adjacent picture carrier		45	$\geq 40$	
			Up adjacent picture carrier		40	$\geq 30$	
9	IF rejection				55	$\geq 45$	dB
10	Image rejection		VHF		57	$\geq 45$	dB
			UHF		55	$\geq 40$	
11	AFT pull-in range				$\pm 1.0$	$\geq  \pm 1.0 $	MHz
12	Chroma sync pull-in range				$\pm 500$	$\geq  \pm 200 $	Hz
13	Color killer function				-11	$\leq -10$	dB
14	Resolution	RF	Horizontal	PAL	300	$\geq 300$	Lines
				NTSC	260	$\geq 240$	Lines
			Vertical	PAL	410	$\geq 400$	Lines
				NTSC	320	$\geq 300$	Lines
		Video	Horizontal		450	$\geq 450$	Lines
			Vertical		400	$\geq 400$	Lines

15	Color Coordination	White	Xw	Full Pattern	0.295	0.295±0.02	
			Yw		0.300	0.300±0.02	
16	View Angle(Lo/3)	Horizontal			170	≥170	Degree
		Vertical					
17	Overscan			Cross hatch signal	96	94~98	%
18	Picture position			In all direction	±2	≤ ±3	mm
19	H sync pull-in range				±400	≥ ±200	Hz
20	V sync pull-in range				6	≥6	Hz
21	Audio frequency response			±3dB ref. to 1KHz	0.15~12	0.2~12	KHz

# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

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22	Max Audio Output Power		7×2	≥5.0×2	W
23	Audio output power 10% THD	1KHz 10% THD	6×2	≥4.0×2	W
24	THD	Po=0.5W	0.5	≤3	%
25	Signal to buzz ratio	coeighting	50	≥30	dB
26	Minimum volume hum	coeighting	6	≤10	mVrms
27	Maximum woofer output power		N/A	N/A	W
28	Woofer audio frequency response	±3dB ref. to 15Hz AV mode	N/A	N/A	Hz
29	Tone low frequency	100Hz ref. to 1KHz AV mode	±8	≥ ±3	dB
30	Tone high frequency	10KHz ref. to 1KHz AV mode	±8	≥ ±3	dB
31	Balance	Center	0	≤ ±2	dB
		Max.	3	>2	
		Min.	-35	≤-30	

32	Video input level			1.0	1±0.3	Vpp
33	Audio input level*（1）			1.0 *	0.5±0.3	Vrms
34	Video output level			N/A	N/A	Vrms
35	Audio output level*（2）			0.3 *	0.5±0.3	Vrms
36	AV Audio input max. level			2	≤2	Vrms dB
37	AV Audio output L/R Separation			35	≥30	
38	Power consumption		Operating	200	≤200	W
			Stand by	3	≤5	W
39	IR receiving distance		0 Degree	7	≥6	m
40	IR receiving angle	left/right	5m	60	≥45	Degree
		Up/down		20	≥15	Degree
41	Dielectric strength		DC 3KV 1min.	5	≤10	mArms
42	The vibration noise from electromagnetic devices in LCD-TV set		The distance between the tester and the LCD-TV set is four times as many as the screen height	No obvious vibration noise can be heard		

Reference No : LC27HAB001  
Revision : 0

# KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

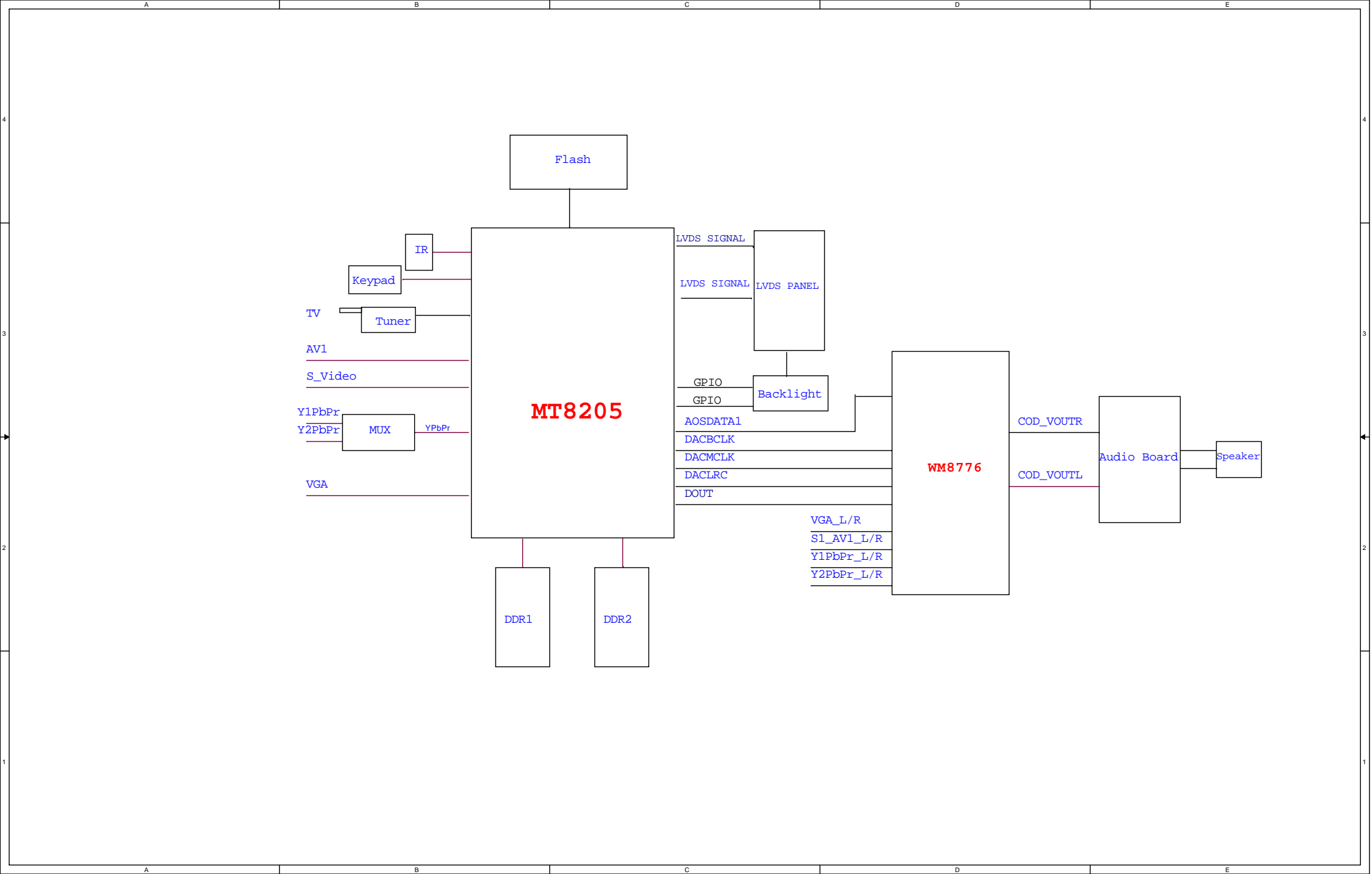
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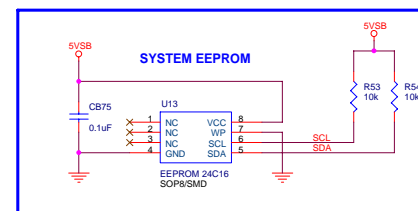
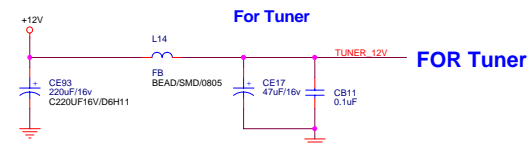
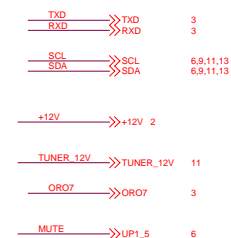
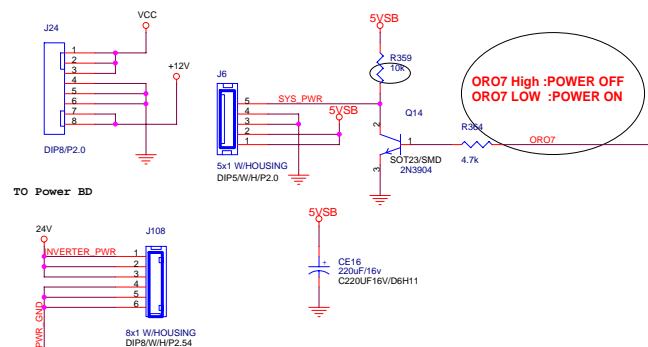
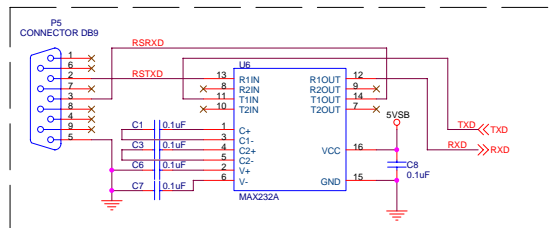
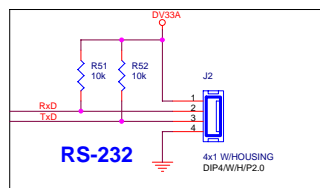
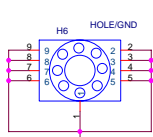
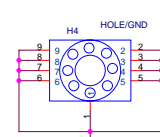
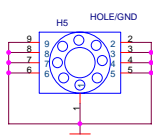
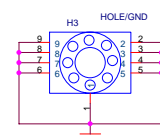
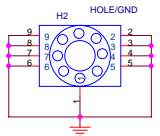
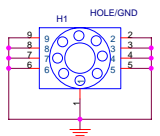
## Test Condition

All tests shall be performed under the following conditions unless otherwise specified

1	Picture Modulation	87.5%
2	Sound Modulation	27KHz Dev. For DK/I/BG 15KHz Dev. For M/N
3	Picture to Sound Ratio	10dB
4	Sound Artificial Load Resistor	8 ohm
5	Video signal	Stair and Special
6	Audio signal	1KHz sine wave 0.5Vrms
7	<b>Other conditions:</b> <b>A.</b> Switch LCD-TV on and let it warm up for more than 30 minutes. Viewing distance: 3H (H: Panel High) in front of LCD, about 2M. Ambient light: $\leq 0.1 \text{ cd/m}^2$ <b>B.</b> Brightness, Contrast, Saturation, Tint, sharpness set at normal. <b>C.</b> Connect RMS volt meter to speaker terminals and adjust the LCD volume to get 500mW RMS power at each terminals. <b>D.</b> With image sticking protection of LCD module. The luminance will descend by time on a same still screen and rapidly go down in 5 minutes, when measuring the color tracking and luminance of a same still screen, be sure to accomplish the measurement in one minute to ensure its accuracy. <b>E.</b> Due to the structure of LCD module. The extra-high-bright same screen should not hold over 5 minutes for fear of branding on the panel. <b>F.</b> RF test point: Video output.	
8	<b>Note:</b> *(1) Now this project cannot fit the limited spec. the typical audio input level is 1.0 Vrms, *(2) The audio out level is controlled by the volume level, the range is from 0 to 0.5Vrms.	

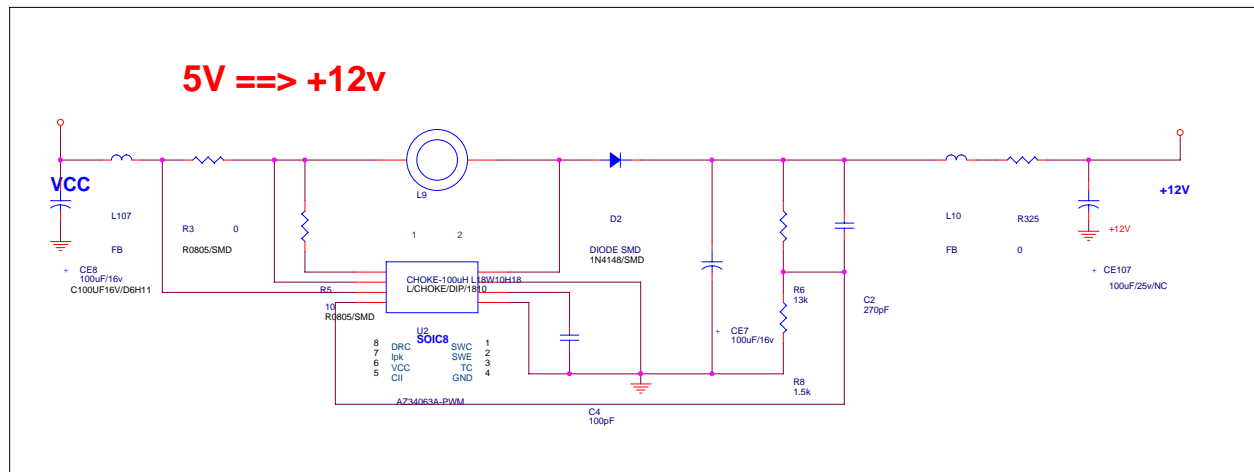
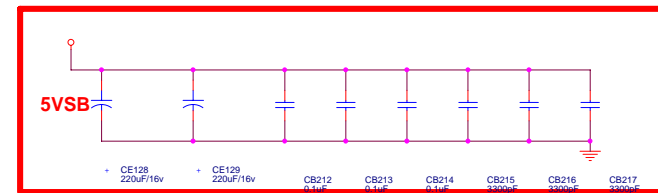
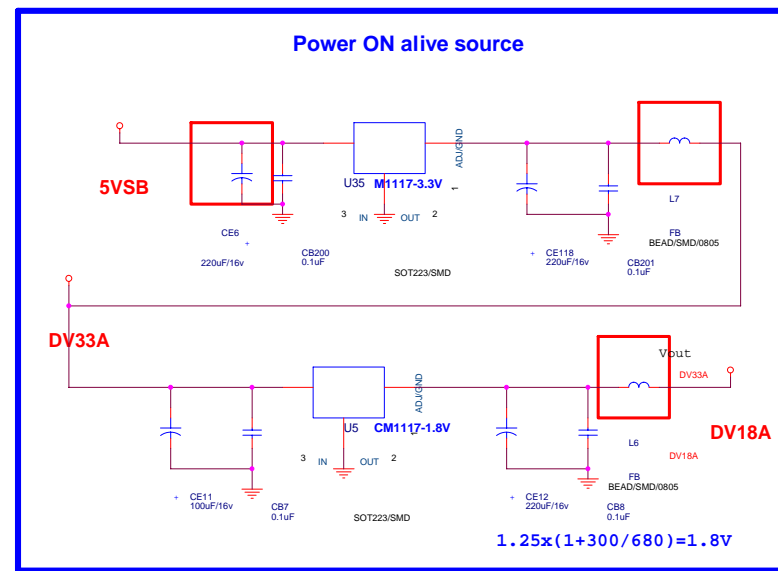
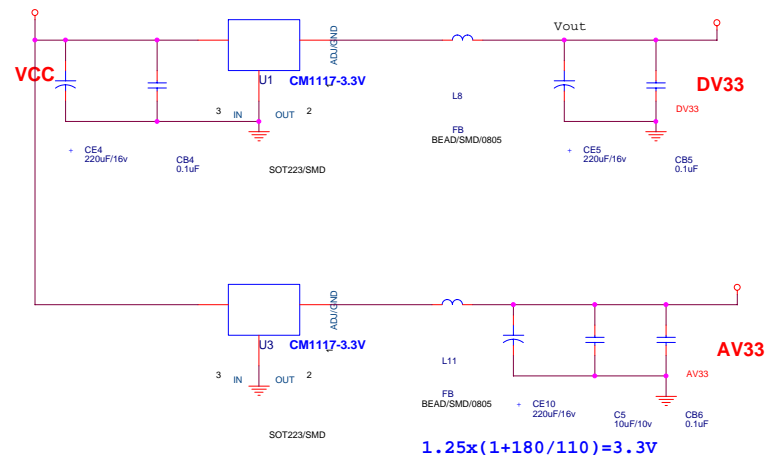


- ```
UP3_0 BLACKLIGHT ON/OFF
MUTE<-->UP1 5
```



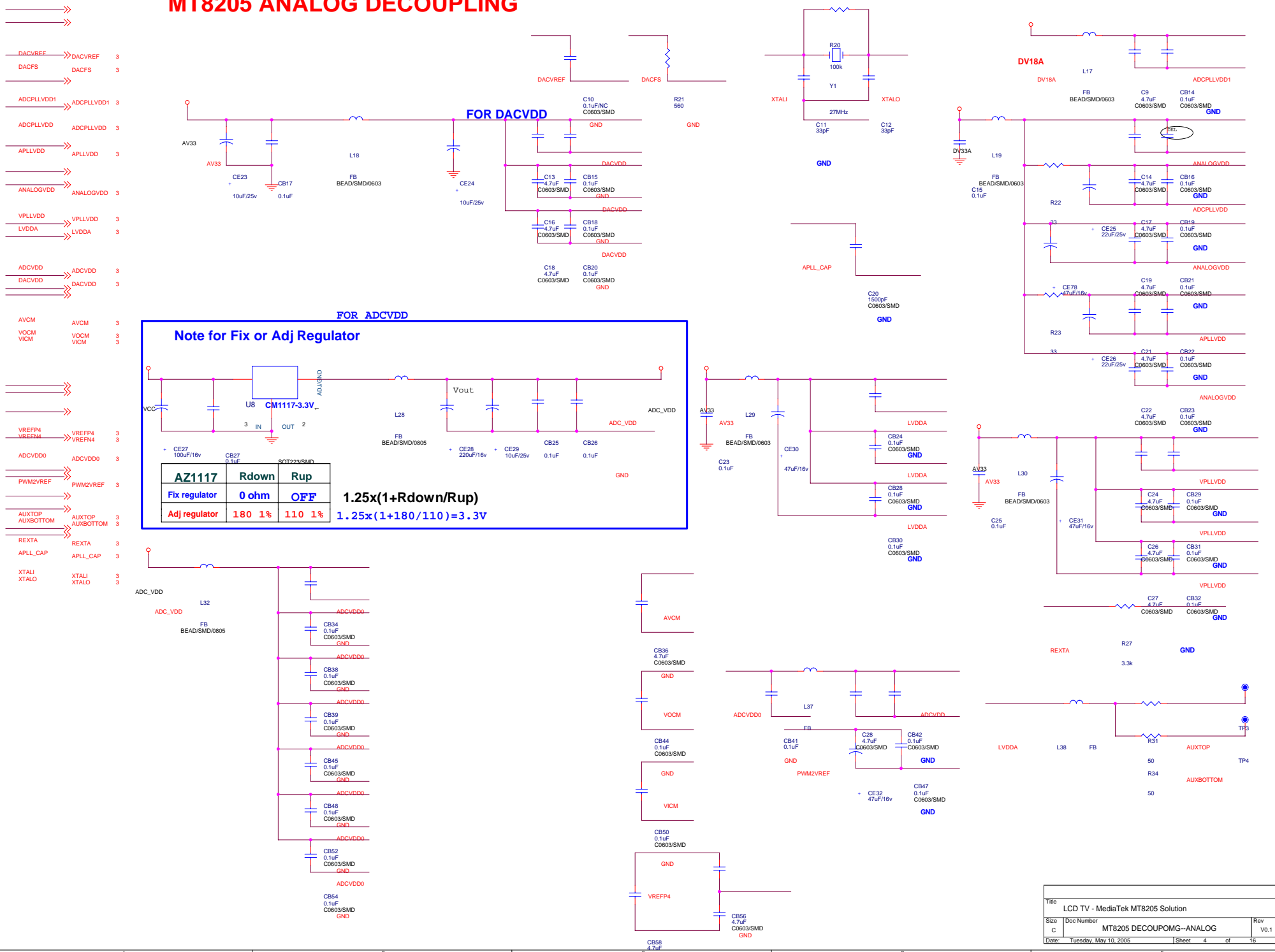
| Rev  | History                                                                                                                                                                                                                    | P# | Date       |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------|
| V0.1 | 1.FIRST VERSION                                                                                                                                                                                                            |    | 2004/11/29 |
| V0.2 | 1. 2.5V use 5VSB conversion. All 0402 change to 0603<br>2. LED_RED/GRN CIRCUIT CHANGE<br>3. Change Power on/off circuit(OR07 CTRL PIN)<br>4. WM8776 DVDD Needed<br>5. Del the Si9936 LVDS Parts<br>6. Del DVI&AD9883 PARTS |    | 2005/03/09 |

|                                   |                       |       |         |
|-----------------------------------|-----------------------|-------|---------|
| Title                             |                       |       |         |
| LCD TV - MediaTek MT8205 Solution |                       |       |         |
| Size                              | Doc Number            | Rev   |         |
| C                                 | INDEX                 | V     |         |
| Date:                             | Tuesday, May 10, 2005 | Sheet | 1 of 16 |



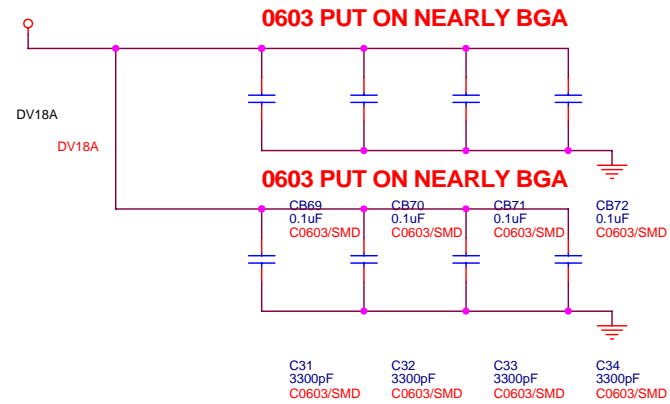
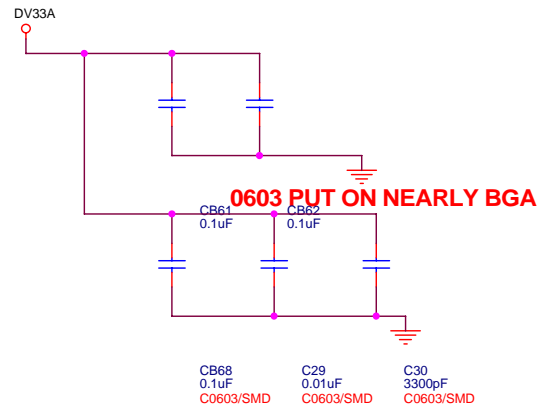


# MT8205 ANALOG DECOUPLING

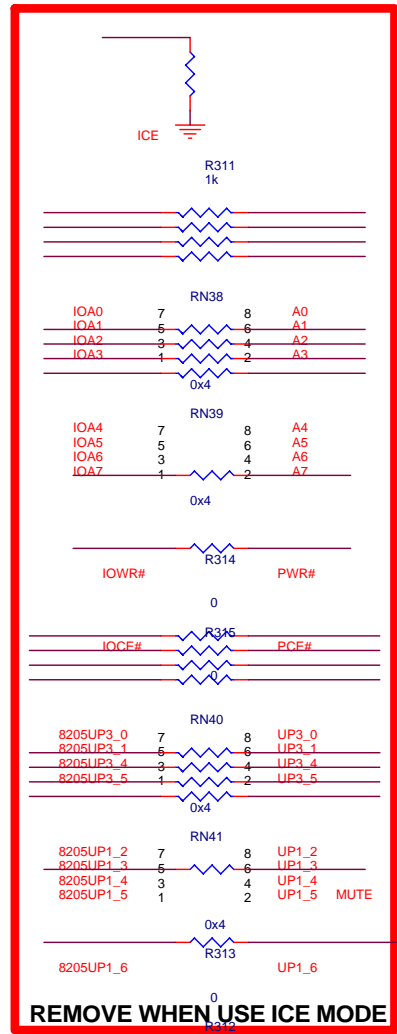
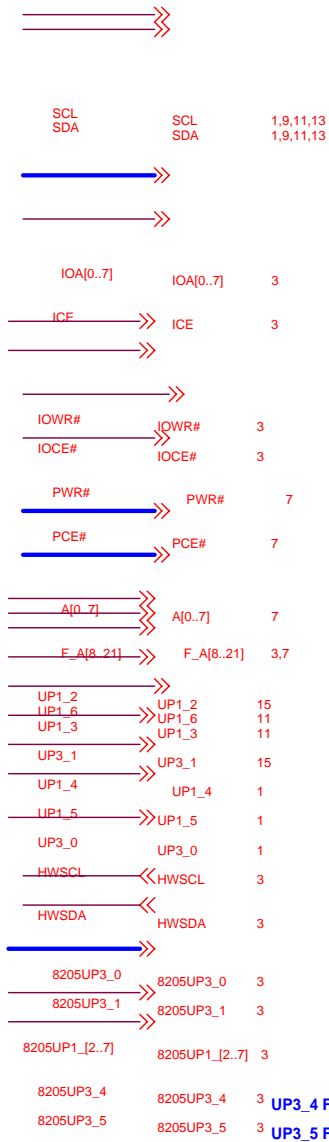




# MT8205 DIGITAL POWER & DECOUPLING



|                                   |                                         |               |
|-----------------------------------|-----------------------------------------|---------------|
| Title                             |                                         |               |
| LCD TV - MediaTek MT8205 Solution |                                         |               |
| Size<br>B                         | Doc Number<br>MT8205 DECOUPOMG--DIGITAL | Rev<br>V0.1   |
| Date:                             | Tuesday, May 10, 2005                   | Sheet 5 of 16 |



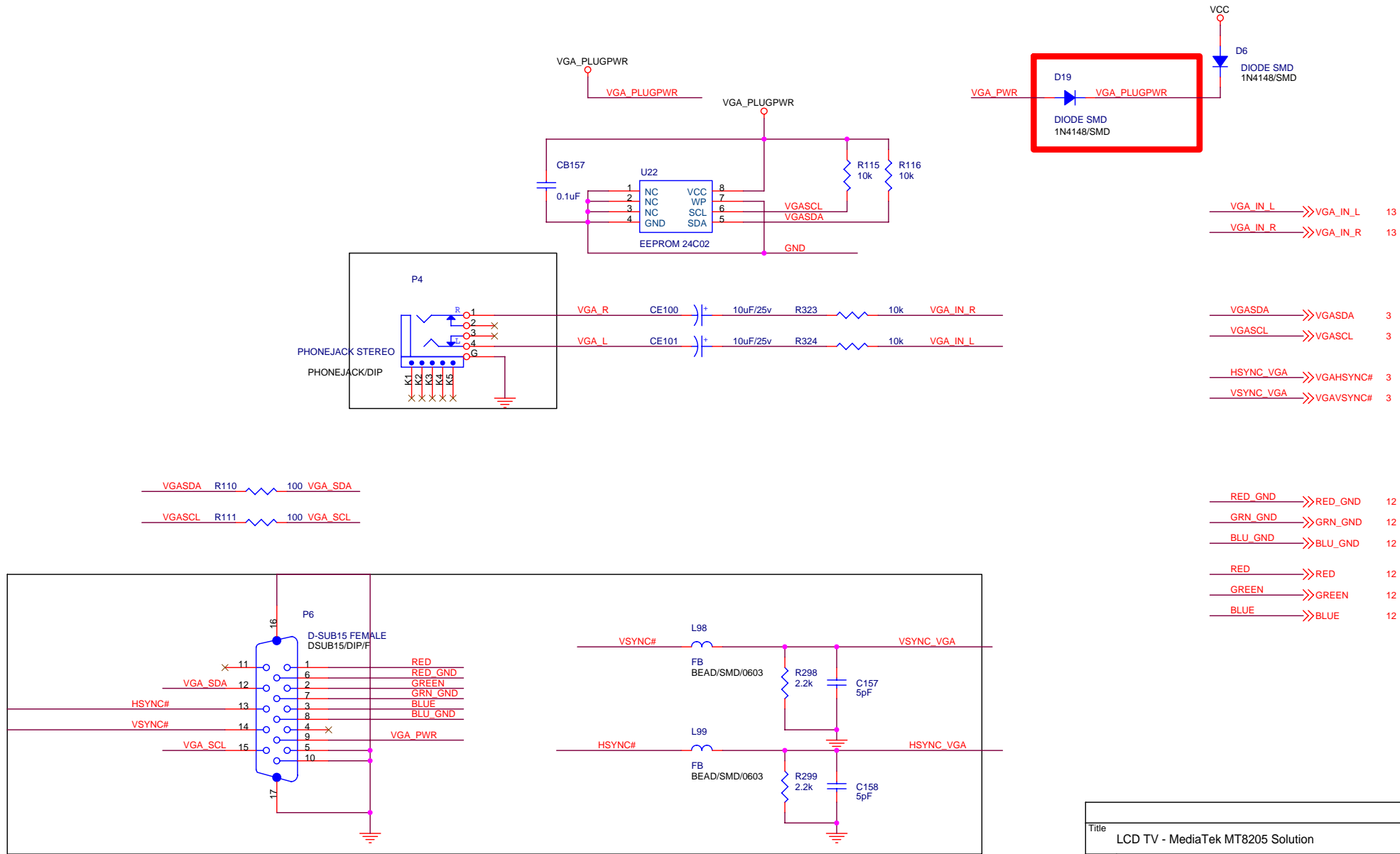
REMOVE WHEN USE ICE MODE

TP28

TEST POINT DIP1.0  
TP/DIP/D1.0

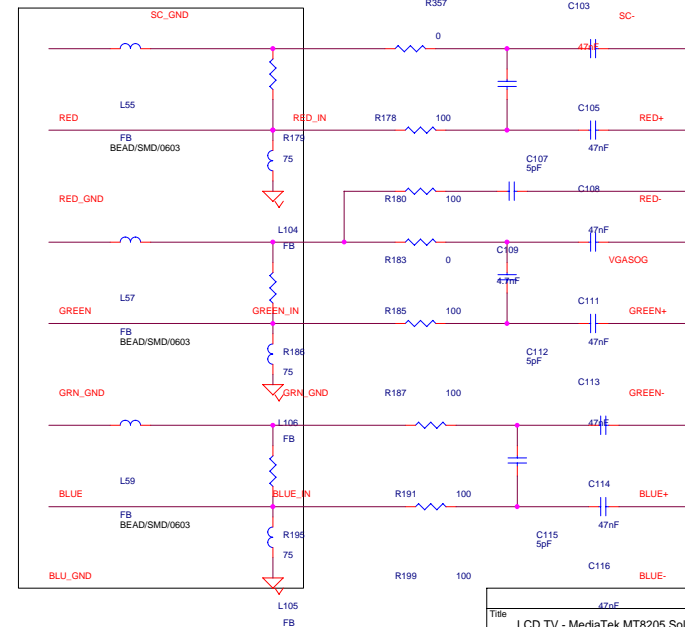
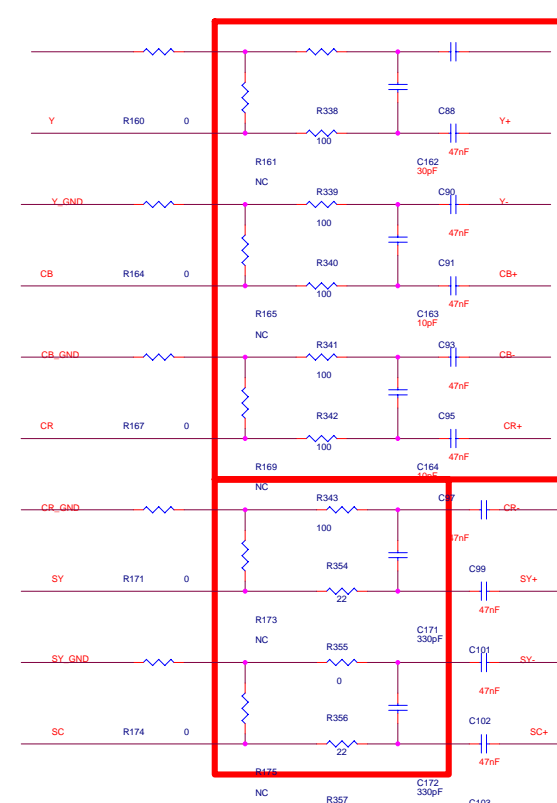
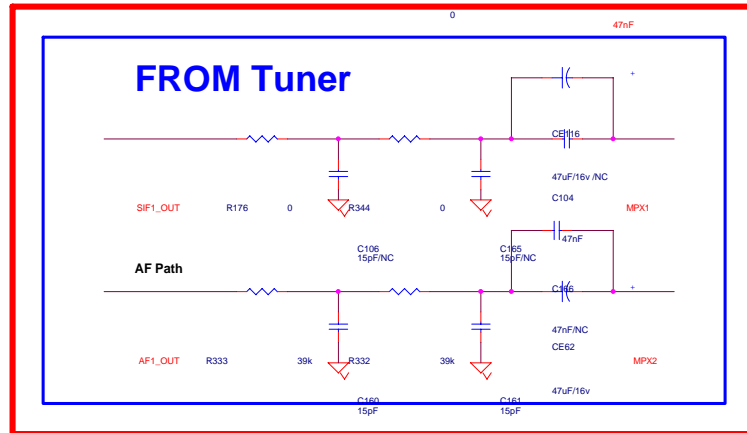
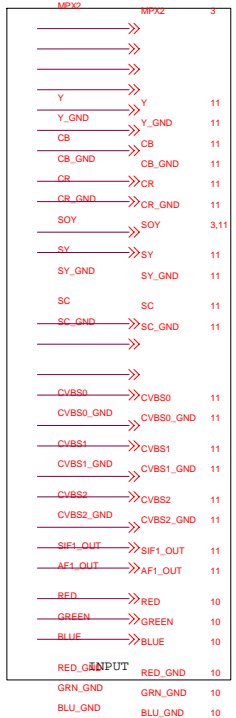
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|-----------------------------------|---------------------------|---------------|
| Title                             |                           |               |
| LCD TV - MediaTek MT8205 Solution |                           |               |
| Size                              | Doc Number                | Rev           |
| B                                 | MT8205 DECOUPOMG--DIGITAL | V0.1          |
| Date:                             | Tuesday, May 10, 2005     | Sheet 6 of 16 |

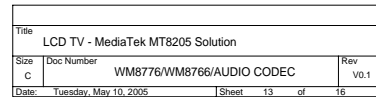
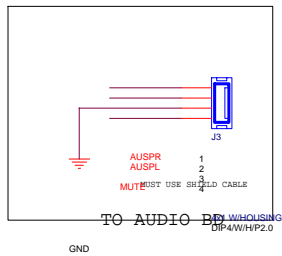


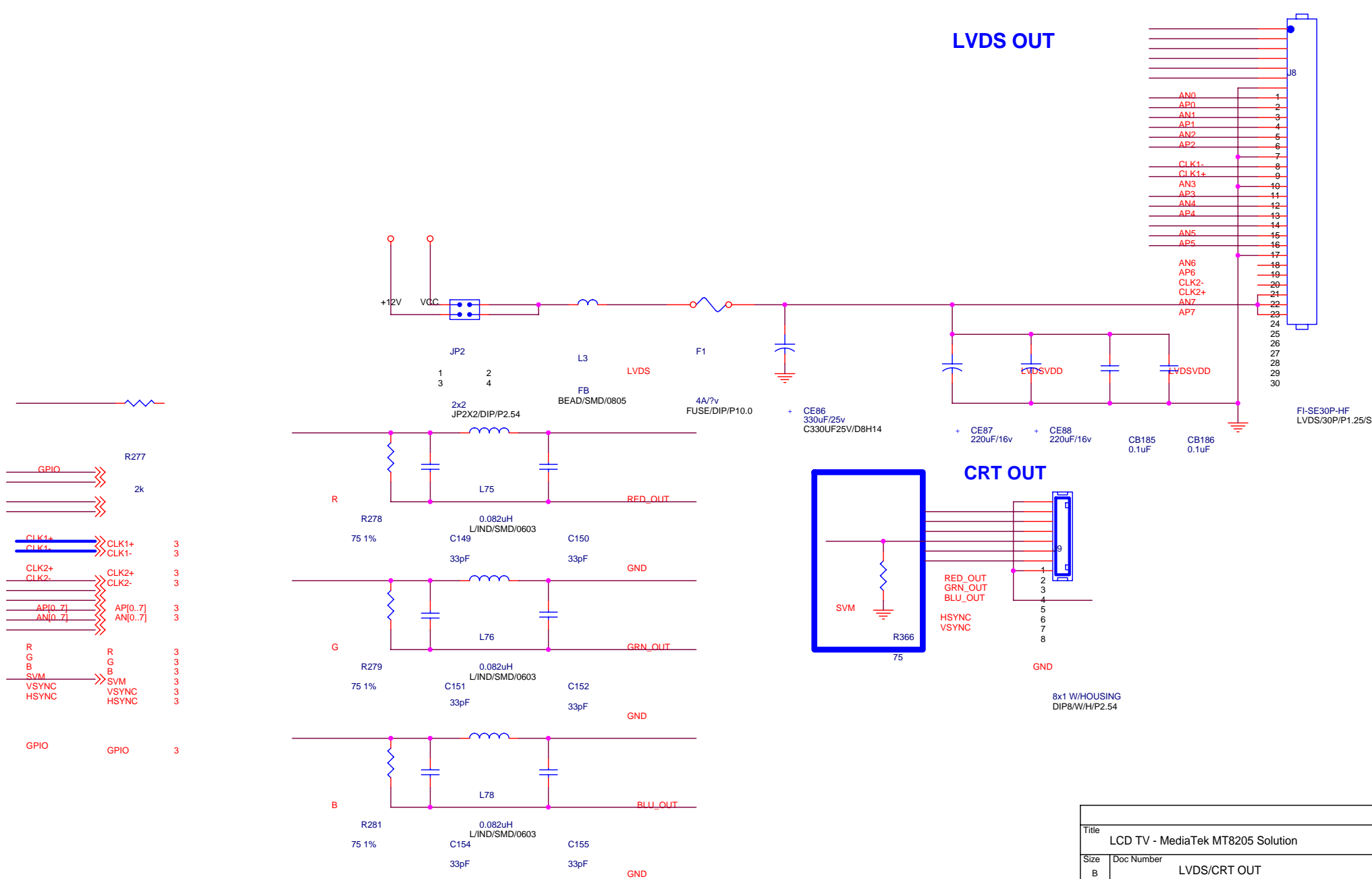


|                                   |                       |                |
|-----------------------------------|-----------------------|----------------|
| Title                             |                       |                |
| LCD TV - MediaTek MT8205 Solution |                       |                |
| Size                              | Doc Number            | Rev            |
| B                                 | VGA IN&PC AUDIO IN    | V0.1           |
| Date:                             | Tuesday, May 10, 2005 | Sheet 10 of 16 |





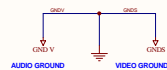


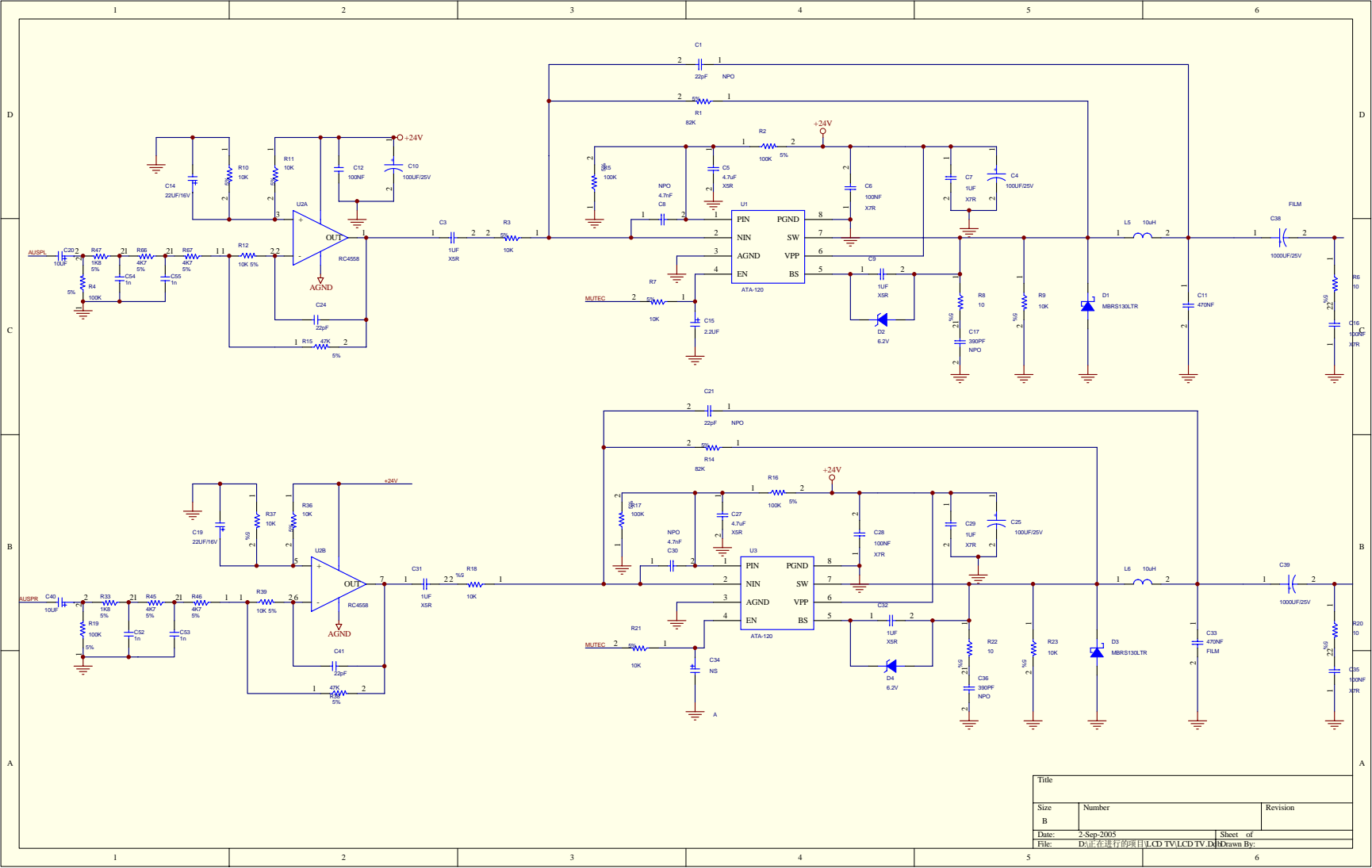


|                                   |                       |       |          |
|-----------------------------------|-----------------------|-------|----------|
| Title                             |                       |       |          |
| LCD TV - MediaTek MT8205 Solution |                       |       |          |
| Size                              | Doc Number            |       | Rev      |
| B                                 | LVDS/CRT OUT          |       | V0.1     |
| Date:                             | Tuesday, May 10, 2005 | Sheet | 14 of 16 |







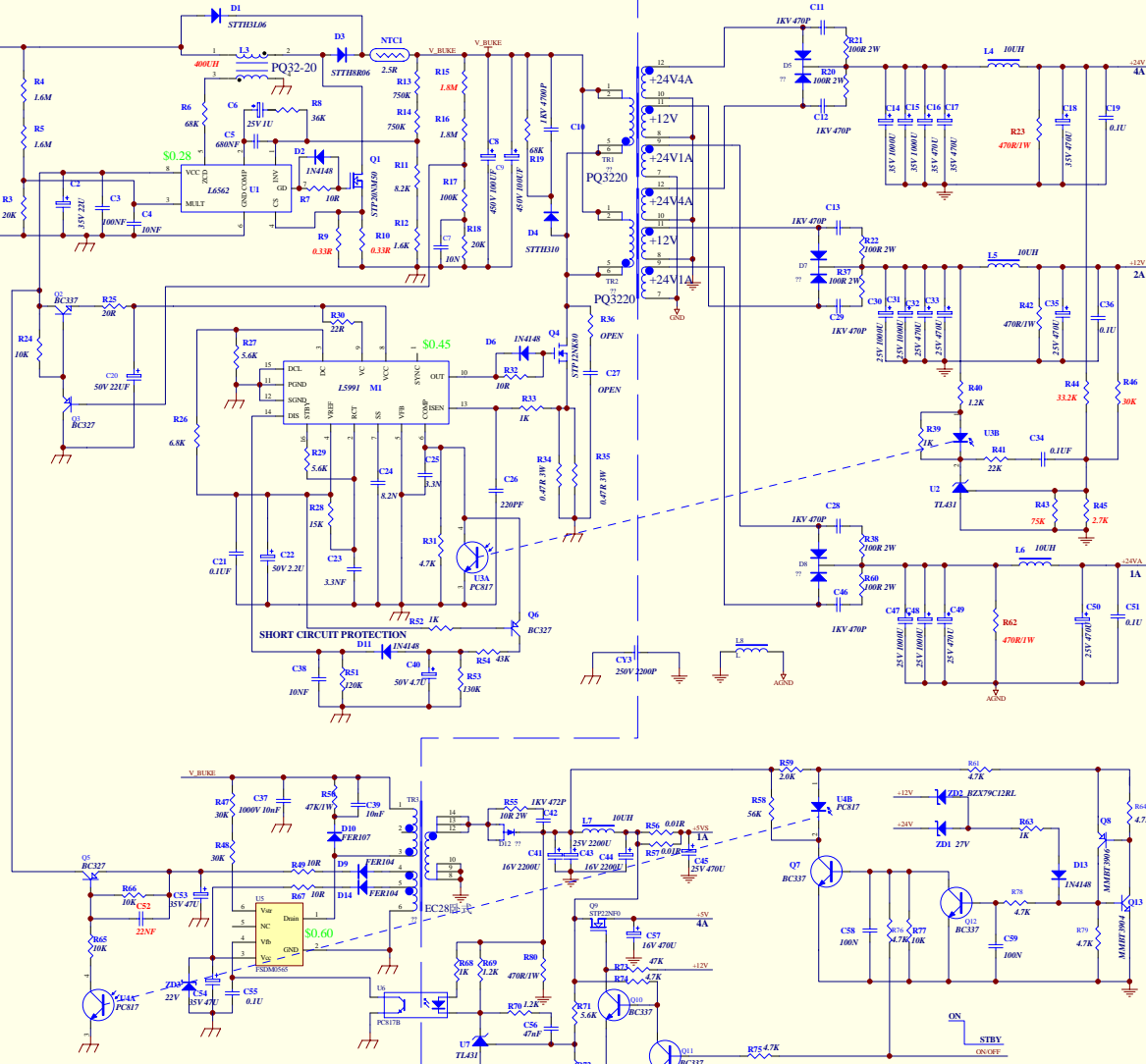


|       |                            |           |
|-------|----------------------------|-----------|
| Title |                            |           |
| Size  | Number                     | Revision  |
| Date: | 2-Sep-2005                 | Sheet of  |
| File: | D:\正在进行的項目\LCD TV\LCD TV.D | Drawn By: |



# LCD-TV 200W SMPS SPEC:

1. +5V 4A
2. +5VS 1A (Standby 5V)
3. +12V 2A
4. +24V 4A
5. +24VA 1A



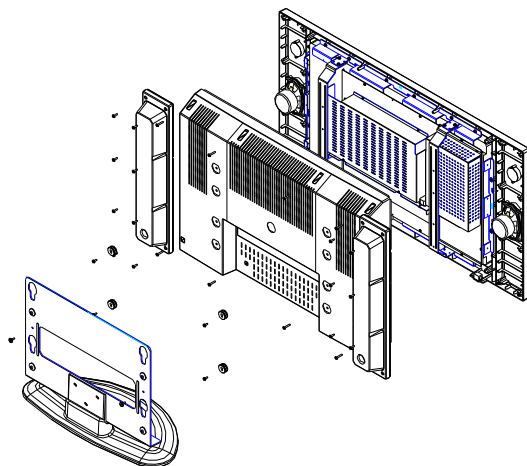
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|-------|----------------------|----------|-----|
| Title | LCD-TV 200W SMPS Sch |          |     |
| Rev   | Number               | Revision |     |
| 0001  | 1                    | Ver1.0   |     |
| Date  | 31m-2005             | Sheet of | 1/1 |
| File  |                      |          |     |

## Disassembly

In case of trouble, etc., Necessitating disassemble, please disassemble in the order shown in the illustrations.

Reassemble in the reverse order.

### 1. Removal of the Back Cover



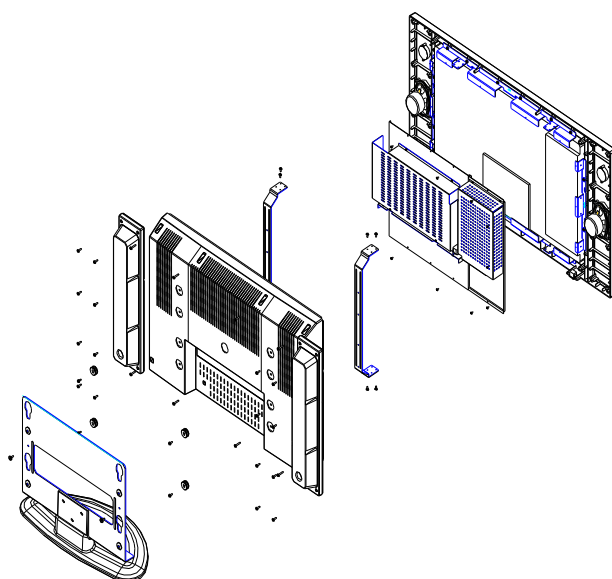
### 2. Removal of the MAIN PCB

a. Remove the screws.

b. Slide out the LCD chassis slightly; pull up the connector of AC cord from PCB; pull up the LCD PCB from LCD.

c. Remove the Anode cap from The picture tube. To avoid a shock hazard, be sure to discharge

d. Take out the LCD chassis.



## **IC DESCRIPTION**

-MT8205G

-AT24C02

-MX29LV160BBTC

-LP2996

-AZ1117/H

-WM8776

-MX232A

-ISAV330

## Pinout information

|      |            |     |            |
|------|------------|-----|------------|
| C3   | VFEVDD1    | C24 | DE DVI     |
| D3   | ADCVD04    | D24 | VSYNCO DVI |
| C1   | SP         | D25 | HSYNC DVI  |
| L11  | AF         | D26 | DVDD18     |
| D1   | REFP4      | A26 | ADSDATA1   |
| D2   | REFN4      | A28 | ADSDATA2   |
| D4   | ADCVSS4    | B26 | DVDD18     |
| D5   | ADIN4      | F23 | ADSDATA3   |
| E1   | ADIN3      | B24 | ADSDATA3   |
| E3   | ADIN2      | C25 | ADSDATA3   |
| E4   | ADIN1      | C24 | ADSDATA3   |
| F1   | ADIN0      | C24 | ADSDATA3   |
| F3   | ADCVDD     | C24 | ADSDATA3   |
| F4   | PWM0VREF   | C24 | ADSDATA3   |
| G3   | AUX0TOP    | C24 | ADSDATA3   |
| H3   | AUX0BOTTOM | C24 | ADSDATA3   |
| G4   | VPLLVS     | C24 | ADSDATA3   |
| H4   | VPLLVD     | C24 | ADSDATA3   |
| H5   | DLLVDD     | C24 | ADSDATA3   |
| K4   | DLLVS      | C24 | ADSDATA3   |
| K5   | BGVSS      | C24 | ADSDATA3   |
| L4   | BGVDD      | C24 | ADSDATA3   |
| L5   | LVDDA      | C24 | ADSDATA3   |
| M1   | ATP        | C24 | ADSDATA3   |
| M2   | ATN        | C24 | ADSDATA3   |
| M3   | CLKIN      | C24 | ADSDATA3   |
| M4   | LVSSA      | C24 | ADSDATA3   |
| N1   | ASP        | C24 | ADSDATA3   |
| N2   | ASN        | C24 | ADSDATA3   |
| N3   | LVSSB      | C24 | ADSDATA3   |
| N4   | LVSSC      | C24 | ADSDATA3   |
| N5   | DACVDDC    | C24 | ADSDATA3   |
| N6   | VREF       | C24 | ADSDATA3   |
| N7   | FS         | C24 | ADSDATA3   |
| N8   | SVM        | C24 | ADSDATA3   |
| N9   | DACVDDB    | C24 | ADSDATA3   |
| N10  | DACVSSB    | C24 | ADSDATA3   |
| N11  | DACVDDA    | C24 | ADSDATA3   |
| N12  | DACVSSA    | C24 | ADSDATA3   |
| N13  | B          | C24 | ADSDATA3   |
| N14  | R          | C24 | ADSDATA3   |
| N15  | DE         | C24 | ADSDATA3   |
| N16  | VSYNCO     | C24 | ADSDATA3   |
| N17  | VCLK       | C24 | ADSDATA3   |
| N18  | EBO7       | C24 | ADSDATA3   |
| N19  | EBO6       | C24 | ADSDATA3   |
| N20  | EBO5       | C24 | ADSDATA3   |
| N21  | EBO4       | C24 | ADSDATA3   |
| N22  | DVDD03     | C24 | ADSDATA3   |
| N23  | EBO2       | C24 | ADSDATA3   |
| N24  | EBO1       | C24 | ADSDATA3   |
| N25  | EBO0       | C24 | ADSDATA3   |
| N26  | EG07       | C24 | ADSDATA3   |
| N27  | DVSS18     | C24 | ADSDATA3   |
| N28  | EG06       | C24 | ADSDATA3   |
| N29  | EG05       | C24 | ADSDATA3   |
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| N39  | ER03       | C24 | ADSDATA3   |
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| N264 | A204       | C24 | ADSDATA3   |
| N265 | A205       | C24 | ADSDATA3   |
| N266 | A206       | C24 | ADSDATA3   |
| N267 | A207       | C24 | ADSDATA3   |
| N268 | A208       | C24 | ADSDATA3   |
| N269 | A209       | C24 | ADSDATA3   |
| N270 | A210       | C24 | ADSDATA3   |
| N271 | A211       | C24 | ADSDATA3   |
| N272 | A212       | C24 | ADSDATA3   |
| N273 | A213       | C24 | ADSDATA3   |
| N274 | A214       | C24 | ADSDATA3   |
| N275 | A215       | C24 | ADSDATA3   |
| N276 | A216       | C24 | ADSDATA3   |
| N277 | A217       | C24 | ADSDATA3   |
| N278 | A218       | C24 | ADSDATA3   |
| N279 | A219       | C24 | ADSDATA3   |
| N280 | A220       | C24 | ADSDATA3   |
| N281 | A221       | C24 | ADSDATA3   |
| N282 | A222       | C24 | ADSDATA3   |
| N283 | A223       | C24 | ADSDATA3   |
| N284 | A224       | C24 | ADSDATA3   |
| N285 | A225       | C24 | ADSDATA3   |
| N286 | A226       | C24 | ADSDATA3   |
| N287 | A227       | C24 | ADSDATA3   |
| N288 | A228       | C24 | ADSDATA3   |
| N289 | A229       | C24 | ADSDATA3   |
| N290 | A230       | C24 | ADSDATA3   |
| N291 | A231       | C24 | ADSDATA3   |
| N292 | A232       | C24 | ADSDATA3   |
| N293 | A233       | C24 | ADSDATA3   |
| N294 | A234       | C24 | ADSDATA3   |
| N295 | A235       | C24 | ADSDATA3   |
| N296 | A236       | C24 | ADSDATA3   |
| N297 | A237       | C24 | ADSDATA3   |
| N298 | A238       | C24 | ADSDATA3   |
| N299 | A239       | C24 | ADSDATA3   |
| N300 | A240       | C24 | ADSDATA3   |
| N301 | A241       | C24 | ADSDATA3   |
| N302 | A242       | C24 | ADSDATA3   |
| N303 | A243       | C24 | ADSDATA3   |
| N304 | A244       | C24 | ADSDATA3   |
| N305 | A245       | C24 |            |



## Pin Descriptions

### 2.3 Pin Descriptions

Table 2-1 provides detail video/audio port pin descriptions.

**Table 2-1 video/audio port pin descriptions.**

| Pin | Symbol   | Type | Description                |
|-----|----------|------|----------------------------|
| E24 | AOMCLK   | O    | Audio out master clock     |
| C25 | AOLRCK   | O    | Audio out left-right clock |
| C26 | AOBCK    | O    | Audio out bit clock        |
| A25 | AOSDATA0 | O    | Audio out data line 0      |
| A26 | AOSDATA1 | O    | Audio out data line 1      |
| B26 | AOSDATA2 | O    | Audio out data line 2      |
| B25 | AOSDATA3 | O    | Audio out data line 3      |
| B24 | LIN      | I    | Audio line in              |
| A3  | CVBS0P   | I    | Composite Video input 0    |
| A2  | CVBS1P   | I    | Composite Video input 1    |
| A1  | CVBS2P   | I    | Composite Video input 2    |
| C1  | SIF      | I    | Tuner Sound SIF            |
| C2  | AF       | I    | Tuner Sound AF             |

## Features

- Low Voltage and Standard Voltage Operation
  - 5.0 (V<sub>CC</sub> = 4.5V to 5.5V)
  - 2.7 (V<sub>CC</sub> = 2.7V to 5.5V)
  - 2.5 (V<sub>CC</sub> = 2.5V to 5.5V)
  - 1.8 (V<sub>CC</sub> = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- 2-Wire Serial Interface
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-Byte Page (1K, 2K), 16-Byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes Are Allowed
- Self-Timed Write Cycle (10 ms max)
- High Reliability
  - Endurance: 1 Million Cycles
  - Data Retention: 100 Years
- Automotive Grade and Extended Temperature Devices Available
- 8-Pin and 14-Pin JEDEC SOIC and 8-Pin PDIP Packages

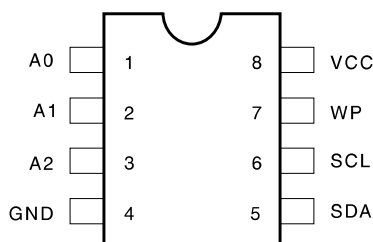
## Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C01A/02/04/08/16 is available in space saving 8-pin PDIP, 8-pin and 14-pin SOIC packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 5.0V (4.5V to 5.5V), 2.7V (2.7V to 5.5V), 2.5V (2.5V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

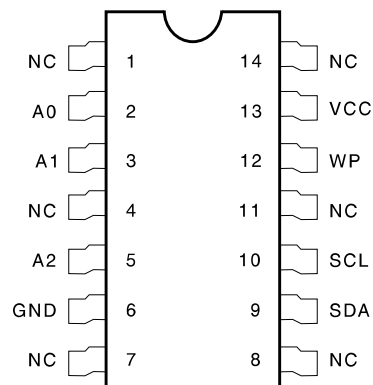
## Pin Configurations

| Pin Name                         | Function           |
|----------------------------------|--------------------|
| A <sub>0</sub> to A <sub>2</sub> | Address Inputs     |
| SDA                              | Serial Data        |
| SCL                              | Serial Clock Input |
| WP                               | Write Protect      |
| NC                               | No Connect         |

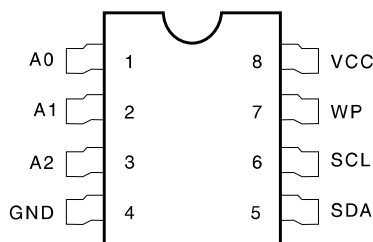
8-Pin PDIP



14-Pin SOIC



8-Pin SOIC



## 2-Wire Serial CMOS E<sup>2</sup>PROM

1K (128 x 8)

2K (256 x 8)

4K (512 x 8)

8K (1024 x 8)

16K (2048 x 8)

|                                                    |                 |
|----------------------------------------------------|-----------------|
| Operating Temperature.....                         | -55°C to +125°C |
| Storage Temperature.....                           | -65°C to +150°C |
| Voltage on Any Pin<br>with Respect to Ground ..... | -0.1V to +7.0V  |
| Maximum Operating Voltage .....                    | 6.25V           |
| DC Output Current.....                             | 5.0 mA          |



## MX29LV160BT/BB

### 16M-BIT [2Mx8/1Mx16] CMOS SINGLE VOLTAGE 3V ONLY FLASH MEMORY

#### FEATURES

- Extended single - supply voltage range 2.7V to 3.6V
- 2,097,152 x 8/1,048,576 x 16 switchable
- Single power supply operation
  - 3.0V only operation for read, erase and program operation
- **Fully compatible with MX29LV160A device**
- Fast access time: 70/90ns
- Low power consumption
  - 30mA maximum active current
  - 0.2uA typical standby current
- Command register architecture
  - Byte/word Programming (9us/11us typical)
  - Sector Erase (Sector structure 16K-Bytex1, 8K-Bytex2, 32K-Bytex1, and 64K-Byte x31)
- Auto Erase (chip & sector) and Auto Program
  - Automatically erase any combination of sectors with Erase Suspend capability.
  - Automatically program and verify data at specified address
- Erase Suspend/Erase Resume
  - Suspends sector erase operation to read data from, or program data to, any sector that is not being erased, then resumes the erase.
- Status Reply
  - Data polling & Toggle bit for detection of program and erase operation completion.
- Ready/Busy pin (RY/BY)
  - Provides a hardware method of detecting program or erase operation completion.
- Sector protection
  - Hardware method to disable any combination of sectors from program or erase operations
  - Temporary sector unprotect allows code changes in previously locked sectors.
- CFI (Common Flash Interface) compliant
  - Flash device parameters stored on the device and provide the host system to access
- 100,000 minimum erase/program cycles
- Latch-up protected to 100mA from -1V to VCC+1V
- Boot Sector Architecture
  - T = Top Boot Sector
  - B = Bottom Boot Sector
- Low VCC write inhibit is equal to or less than 1.4V
- Package type:
  - 44-pin SOP
  - 48-pin TSOP
  - 48-ball CSP
- Compatibility with JEDEC standard
  - Pinout and software compatible with single-power supply Flash
- 10 years data retention

#### GENERAL DESCRIPTION

The MX29LV160BT/BB is a 16-mega bit Flash memory organized as 2M bytes of 8 bits or 1M words of 16 bits. MXIC's Flash memories offer the most cost-effective and reliable read/write non-volatile random access memory. The MX29LV160BT/BB is packaged in 44-pin SOP, 48-pin TSOP and 48-ball CSP. It is designed to be reprogrammed and erased in system or in standard EPROM programmers.

The standard MX29LV160BT/BB offers access time as fast as 70ns, allowing operation of high-speed microprocessors without wait states. To eliminate bus contention, the MX29LV160BT/BB has separate chip enable ( $\overline{CE}$ ) and output enable ( $\overline{OE}$ ) controls.

MXIC's Flash memories augment EPROM functionality with in-circuit electrical erasure and programming. The MX29LV160BT/BB uses a command register to manage this functionality. The command register allows for

100% TTL level control inputs and fixed power supply levels during erase and programming, while maintaining maximum EPROM compatibility.

MXIC Flash technology reliably stores memory contents even after 100,000 erase and program cycles. The MXIC cell is designed to optimize the erase and programming mechanisms. In addition, the combination of advanced tunnel oxide processing and low internal electric fields for erase and program operations produces reliable cycling. The MX29LV160BT/BB uses a 2.7V~3.6V VCC supply to perform the High Reliability Erase and auto Program/Erase algorithms.

The highest degree of latch-up protection is achieved with MXIC's proprietary non-epi process. Latch-up protection is proved for stresses up to 100 milliamps on address and data pin from -1V to VCC + 1V.

## LP2996

### DDR Termination Regulator

#### General Description

The LP2996 linear regulator is designed to meet the JEDEC SSTL-2 specifications for termination of DDR-SDRAM. The device contains a high-speed operational amplifier to provide excellent response to load transients. The output stage prevents shoot through while delivering 1.5A continuous current and transient peaks up to 3A in the application as required for DDR-SDRAM termination. The LP2996 also incorporates a  $V_{SENSE}$  pin to provide superior load regulation and a  $V_{REF}$  output as a reference for the chipset and DIMMs.

An additional feature found on the LP2996 is an active low shutdown ( $\overline{SD}$ ) pin that provides Suspend To RAM (STR) functionality. When  $\overline{SD}$  is pulled low the  $V_{TT}$  output will tri-state providing a high impedance output, but,  $V_{REF}$  will remain active. A power savings advantage can be obtained in this mode through lower quiescent current.

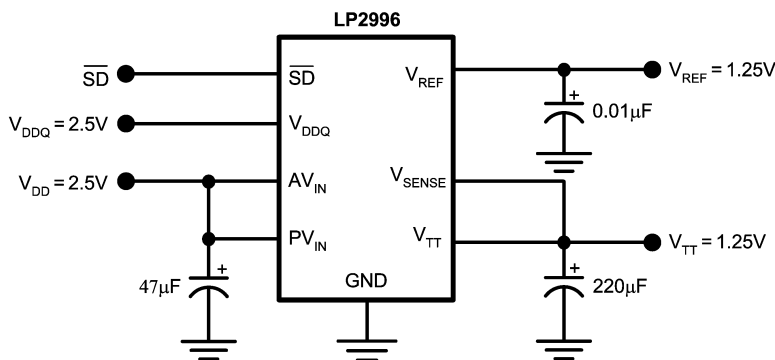
#### Features

- Source and sink current
- Low output voltage offset
- No external resistors required
- Linear topology
- Suspend to Ram (STR) functionality
- Low external component count
- Thermal Shutdown
- Available in SO-8, PSOP-8 or LLP-16 packages

#### Applications

- DDR-I and DDR-II Termination Voltage
- SSTL-2 and SSTL-3 Termination
- HSTL Termination

#### Typical Application Circuit



20057518

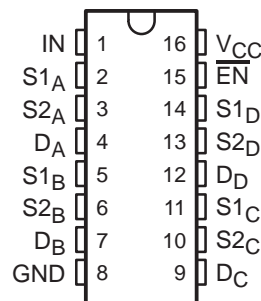
# TS5V330

## QUAD SPDT WIDE-BANDWIDTH VIDEO SWITCH WITH LOW ON-STATE RESISTANCE

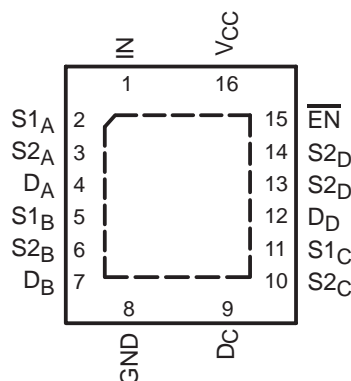
SCDS164A – MAY 2004 – REVISED MAY 2004

- Low Differential Gain and Phase ( $D_G = 0.64\%$ ,  $D_P = 0.1$  Degrees Typ)
- Wide Bandwidth (BW = 300 MHz Min)
- Low Crosstalk ( $X_{TALK} = -63$  dB Typ)
- Low Power Consumption ( $I_{CC} = 3 \mu A$  Max)
- Bidirectional Data Flow, With Near-Zero Propagation Delay
- Low ON-State Resistance ( $r_{on} = 3 \Omega$  Typ)
- $V_{CC}$  Operating Range From 4.5 V to 5.5 V
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Data and Control Inputs Provide Undershoot Clamp Diode
- Control Inputs Can Be Driven by TTL or 5-V/3.3-V CMOS Outputs
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Performance Tested Per JESD 22
  - 2000-V Human-Body Model (A114-B, Class II)
  - 1000-V Charged-Device Model (C101)
- Suitable for Both RGB and Composite-Video Switching

D, DBQ, OR PW PACKAGE  
(TOP VIEW)



RGY PACKAGE  
(TOP VIEW)



### description/ordering information

The TI TS5V330 video switch is a 4-bit 1-of-2 multiplexer/demultiplexer with a single switch-enable ( $\overline{EN}$ ) input. When  $\overline{EN}$  is low, the switch is enabled and the D port is connected to the S port. When  $\overline{EN}$  is high, the switch is disabled and the high-impedance state exists between the D and S ports. The select (IN) input controls the data path of the multiplexer/demultiplexer.

### ORDERING INFORMATION

| $T_A$         | PACKAGE†   |               | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|---------------|------------|---------------|-----------------------|------------------|
| –40°C to 85°C | QFN – RGY  | Tape and reel | TS5V330RGYR           | TE330            |
|               |            | Tube          | TS5V330D              | TS5V330          |
|               | SOIC – D   | Tape and reel | TS5V330DR             |                  |
|               |            | Tape and reel | TS5V330DBQR           | TE330            |
|               | TSSOP – PW | Tube          | TS5V330PW             | TE330            |
|               |            | Tape and reel | TS5V330PWR            |                  |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



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## 24-bit, 192kHz Stereo CODEC with 5 Channel I/P Multiplexer

### DESCRIPTION

The WM8776 is a high performance, stereo audio CODEC with five channel input selector. The WM8776 is ideal for surround sound processing applications for home hi-fi, DVD-RW and other audio visual equipment.

A stereo 24-bit multi-bit sigma delta ADC is used with a five stereo channel input mixer. Each ADC channel has programmable gain control with automatic level control. Digital audio output word lengths from 16-32 bits and sampling rates from 32kHz to 96kHz are supported.

A stereo 24-bit multi-bit sigma delta DAC is used with digital audio input word lengths from 16-32 bits and sampling rates from 32kHz to 192kHz. The DAC has an input mixer allowing an external analogue signal to be mixed with the DAC signal. There are also Headphone and line outputs, with volume controls for the headphones.

The WM8776 supports fully independent sample rates for the ADC and DAC. The audio data interface supports I<sup>2</sup>S, left justified, right justified and DSP formats.

The device is controlled in software via a 2 or 3 wire serial interface, selected by the MODE pin, which provides access to all features including channel selection, volume controls, mutes, and de-emphasis facilities.

The device is available in a 48-pin TQFP package.

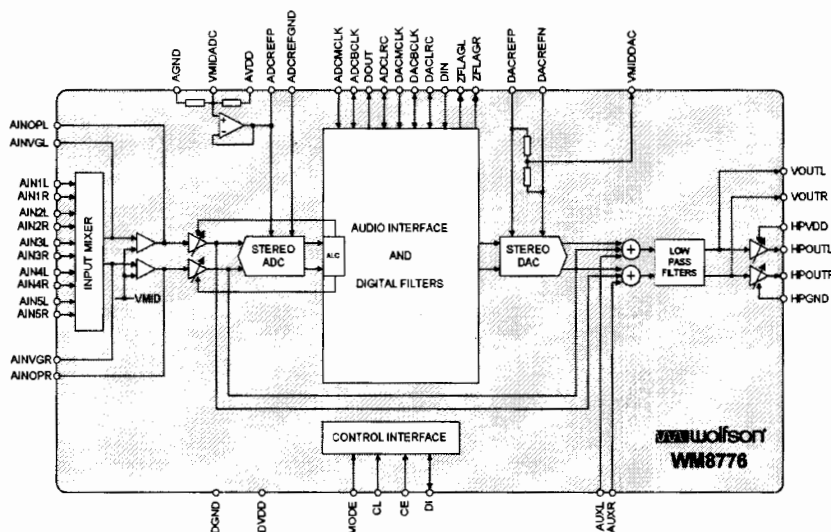
## FEATURES

- Audio Performance
  - 108dB SNR ('A' weighted @ 48kHz) DAC
  - 102dB SNR ('A' weighted @ 48kHz) ADC
- DAC Sampling Frequency: 32kHz – 192kHz
- ADC Sampling Frequency: 32kHz – 96kHz
- Five stereo ADC inputs with analogue gain adjust from +24dB to -21dB in 0.5dB steps
- Programmable Limiter or Automatic Level Control (ALC)
- Stereo DAC with independent analogue and digital volume controls
- Stereo Headphone and Line Output
- 3-Wire SPI Compatible or 2-Wire Software Serial Control Interface
- Master or Slave Clocking Mode
- Programmable Audio Data Interface Modes
  - I<sup>2</sup>S, Left, Right Justified or DSP
  - 16/20/24/32 bit Word Lengths
- Analogue Bypass Path Feature
- Selectable AUX input to the volume controls
- 2.7V to 5.5V Analogue, 2.7V to 3.6V Digital supply Operation

## APPLICATIONS

- Surround Sound AV Processors and Hi-Fi systems
- DVD-RW

### BLOCK DIAGRAM





## ±15kV ESD-Protected, +5V RS-232 Transceivers

### General Description

The MAX202E-MAX213E, MAX232E/MAX241E line drivers/receivers are designed for RS-232 and V.28 communications in harsh environments. Each transmitter output and receiver input is protected against ±15kV electrostatic discharge (ESD) shocks, without latchup. The various combinations of features are outlined in the *Selection Guide*. The drivers and receivers for all ten devices meet all EIA/TIA-232E and CCITT V.28 specifications at data rates up to 120kbps, when loaded in accordance with the EIA/TIA-232E specification.

The MAX211E/MAX213E/MAX241E are available in 28-pin SO packages, as well as a 28-pin SSOP that uses 60% less board space. The MAX202E/MAX232E come in 16-pin narrow SO, wide SO, and DIP packages. The MAX203E comes in a 20-pin DIP/SO package, and needs no external charge-pump capacitors. The MAX205E comes in a 24-pin wide DIP package, and also eliminates external charge-pump capacitors. The MAX206E/MAX207E/MAX208E come in 24-pin SO, SSOP, and narrow DIP packages. The MAX232E/MAX241E operate with four 1μF capacitors, while the MAX202E/MAX206E/MAX207E/MAX208E/MAX211E/MAX213E operate with four 0.1μF capacitors, further reducing cost and board space.

### Applications

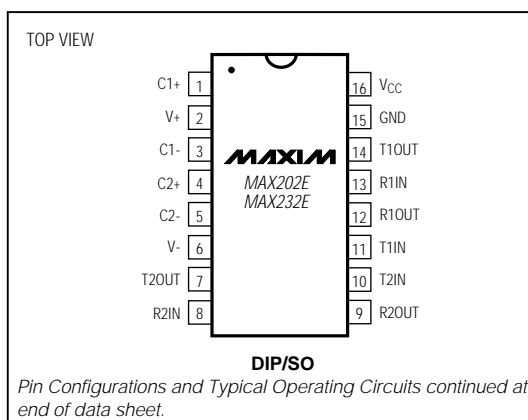
Notebook, Subnotebook, and Palmtop Computers  
Battery-Powered Equipment  
Hand-Held Equipment

Ordering Information appears at end of data sheet.

### Features

- ♦ **ESD Protection for RS-232 I/O Pins:**
  - ±15kV—Human Body Model
  - ±8kV—IEC1000-4-2, Contact Discharge
  - ±15kV—IEC1000-4-2, Air-Gap Discharge
- ♦ **Latchup Free (unlike bipolar equivalents)**
- ♦ **Guaranteed 120kbps Data Rate—LapLink™ Compatible**
- ♦ **Guaranteed 3V/μs Min Slew Rate**
- ♦ **Operate from a Single +5V Power Supply**

### Pin Configurations



### Selection Guide

| PART    | No. of RS-232 DRIVERS | No. of RS-232 RECEIVERS | RECEIVERS ACTIVE IN SHUTDOWN | No. of EXTERNAL CAPACITORS | LOW-POWER SHUTDOWN | TTL THREE-STATE |
|---------|-----------------------|-------------------------|------------------------------|----------------------------|--------------------|-----------------|
| MAX202E | 2                     | 2                       | 0                            | 4 (0.1μF)                  | No                 | No              |
| MAX203E | 2                     | 2                       | 0                            | None                       | No                 | No              |
| MAX205E | 5                     | 5                       | 0                            | None                       | Yes                | Yes             |
| MAX206E | 4                     | 3                       | 0                            | 4 (0.1μF)                  | Yes                | Yes             |
| MAX207E | 5                     | 3                       | 0                            | 4 (0.1μF)                  | No                 | No              |
| MAX208E | 4                     | 4                       | 0                            | 4 (0.1μF)                  | No                 | No              |
| MAX211E | 4                     | 5                       | 0                            | 4 (0.1μF)                  | Yes                | Yes             |
| MAX213E | 4                     | 5                       | 2                            | 4 (0.1μF)                  | Yes                | Yes             |
| MAX232E | 2                     | 2                       | 0                            | 4 (1μF)                    | No                 | No              |
| MAX241E | 4                     | 5                       | 0                            | 4 (1μF)                    | Yes                | Yes             |

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Maxim Integrated Products 1

For free samples & the latest literature: <http://www.maxim-ic.com>, or phone 1-800-998-8800

MAX202E-MAX213E, MAX232E/MAX241E

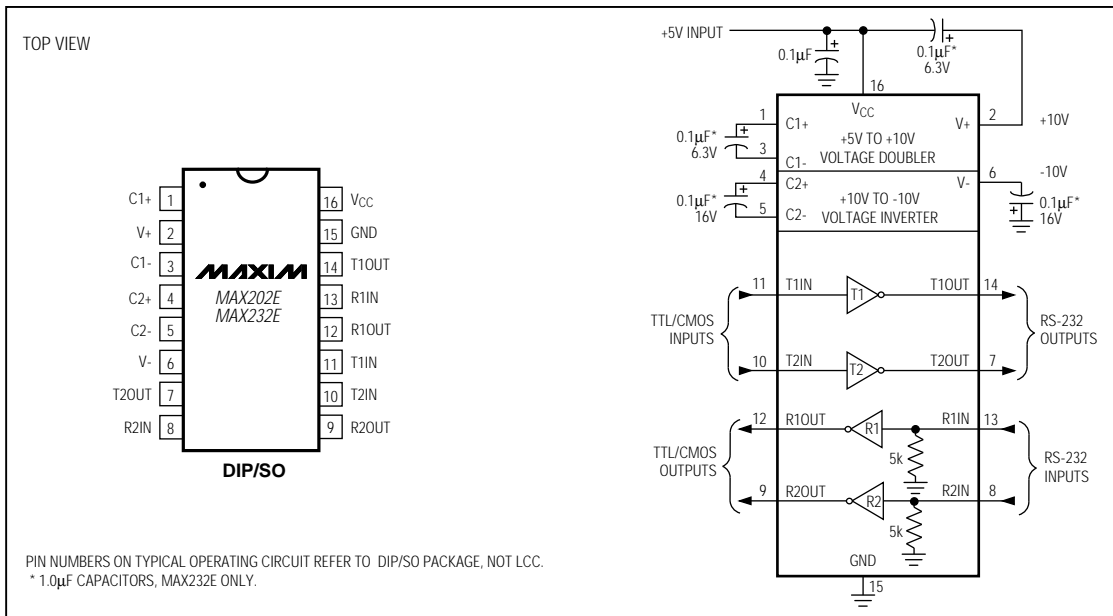


## ±15kV ESD-Protected, +5V RS-232 Transceivers

**Table 3. DB9 Cable Connections**  
Commonly Used for EIA/TIAE-232E and V.24 Asynchronous Interfaces

| PIN | CONNECTION                                                           |                             |
|-----|----------------------------------------------------------------------|-----------------------------|
| 1   | Received Line Signal Detector (sometimes called Carrier Detect, DCD) | Handshake from DCE          |
| 2   | Receive Data (RD)                                                    | Data from DCE               |
| 3   | Transmit Data (TD)                                                   | Data from DTE               |
| 4   | Data Terminal Ready                                                  | Handshake from DTE          |
| 5   | Signal Ground                                                        | Reference point for signals |
| 6   | Data Set Ready (DSR)                                                 | Handshake from DCE          |
| 7   | Request to Send (RTS)                                                | Handshake from DTE          |
| 8   | Clear to Send (CTS)                                                  | Handshake from DCE          |
| 9   | Ring Indicator                                                       | Handshake from DCE          |

### Pin Configurations and Typical Operating Circuits (continued)



## TFT LCD Approval Specification

# MODEL NO.: V270W1 - L03

Customer: \_\_\_\_\_

Approved by: \_\_\_\_\_

Note:

| LCD TV Head Division |     |
|----------------------|-----|
| Director             | 鄧振隆 |

| QRA Dept. | TD Division | DDII     | DDI      |
|-----------|-------------|----------|----------|
| Approval  | Approval    | Approval | Approval |
| 陳永一       | 李冠輝         | 鈴木慶      | 林文聰      |

| LCD TV Marketing and Project Management Dept. |         |
|-----------------------------------------------|---------|
| Project Manager                               | 胡崇銘、陳立宜 |

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### REVISION HISTORY

| Version | Date        | Page (New) | Section | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|-------------|------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ver 1.0 | August 1,03 | All        | All     | Preliminary Specification is first issued.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Ver 2.0 | Sep. 18,03  | 17         | 7.2     | Contrast ratio:Typ. (600)→600<br>Response time $T_R$ :Typ. (15)→15<br>$T_F$ : Typ. (10)→10<br>Gray to Gray: Typ (16.6)→16.6<br>Center Luminance of White: Min. (450)→450<br>Typ. (550)→550<br>Average Luminance of White: Min. (400)→400<br>Typ. (450)→450<br>Color Chromaticity   Min.   Typ.   Max.       Min.   Typ.   Max.<br>Red Rx (0.616)(0.646)(0.676)→0.616   0.646   0.676<br>Ry (0.302)(0.332)(0.362)→0.302   0.332   0.362<br>Green Gx(0.239)(0.269)(0.299)→0.239   0.269   0.299<br>Gy(0.570)(0.600)(0.630)→0.570   0.600   0.630<br>Blue Bx(0.112)(0.142)(0.172)→0.112   0.142   0.172<br>By(0.042)(0.072)(0.102)→0.042   0.072   0.102<br>Viewing Angle Horizontal $\theta_x$ + Typ. (85)→85<br>$\theta_x$ - Typ. (85)→85<br>Vertical $\theta_y$ + Typ. (85)→85<br>$\theta_y$ - Typ. (85)→85 |
|         |             | 5          | 2.1     | Shock (Non-Operating) Max. Value (100)→100<br>Vibration (Non-Operating) Max. Value (1.0)→1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## 1. GENERAL DESCRIPTION

### 1.1 OVERVIEW

V270W1- L03 is a 27" TFT Liquid Crystal Display module with 14-CCFL Backlight unit and 1ch-LVDS interface. This module supports 1280 x 720 WXGA format and can display true 16.7M colors ( 8-bit/color). The inverter module for backlight is build-in.

### 1.2 FEATURES

- Ultra wide viewing angle – Super MVA technology
- High brightness (550 nits)
- High contrast ratio (600:1)
- Fast response time
- High color saturation NTSC 75%
- WXGA (1280 x 720 pixels) resolution, true HDTV format.
- DE (Data Enable) only mode
- LVDS (Low Voltage Differential Signaling) interface

### 1.3 APPLICATION

- TFT LCD TVs

### 1.4 GENERAL SPECIFICATIONS

| Item                    | Specification                                                                                    | Unit  | Note |
|-------------------------|--------------------------------------------------------------------------------------------------|-------|------|
| Active Area             | 597.12(H) x 335.88 (V) (26.97" diagonal)                                                         | mm    | (1)  |
| Bezel Opening Area      | 603.22 (H) x 341.98 (V)                                                                          | mm    |      |
| Driver Element          | a-si TFT active matrix                                                                           | -     | -    |
| Pixel Number            | 1280 x R.G.B. x 720                                                                              | pixel | -    |
| Pixel Pitch (Sub Pixel) | 0.1555 (H) x 0.4665 (V)                                                                          | mm    | -    |
| Pixel Arrangement       | RGB vertical stripe                                                                              | -     | -    |
| Display Colors          | 16.7M                                                                                            | color | -    |
| Display Operation Mode  | Transmissive mode / Normally black                                                               | -     | -    |
| Surface Treatment       | Anti-glare with anti-reflective coating<br>Hard coating (2H), Haze: 40%<br>Reflection Rate: < 2% | -     | -    |

### 1.5 MECHANICAL SPECIFICATIONS

| Item        |               |         | Min. | Typ.   | Max. | Unit | Note                    |
|-------------|---------------|---------|------|--------|------|------|-------------------------|
| Module Size | Horizontal(H) |         |      | 637.55 |      | mm   | Module Size<br>Depth(D) |
|             | Vertical(V)   |         |      | 379.8  |      | mm   |                         |
|             | Depth(D)      | W/O INV | -    |        | 36   | mm   |                         |
|             |               | W/I INV | 40   | 40.5   | 41   | mm   |                         |
| Weight      |               |         | -    | 4300   |      | g    | -                       |

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) Module Depth does not include connectors.

## 2. ABSOLUTE MAXIMUM RATINGS

### 2.1 ABSOLUTE RATINGS OF ENVIRONMENT

| Item                          | Symbol           | Value |      | Unit | Note     |
|-------------------------------|------------------|-------|------|------|----------|
|                               |                  | Min.  | Max. |      |          |
| Storage Temperature           | T <sub>ST</sub>  | -20   | +60  | °C   | (1)      |
| Operating Ambient Temperature | T <sub>OP</sub>  | 0     | +50  | °C   | (1), (2) |
| Shock (Non-Operating)         | S <sub>NOP</sub> | -     | 100  | G    | (3), (5) |
| Vibration (Non-Operating)     | V <sub>NOP</sub> | -     | 1.0  | G    | (4), (5) |

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. ( $T_a \leq 40$  °C).

(b) Wet-bulb temperature should be 39 °C Max. ( $T_a > 40$  °C).

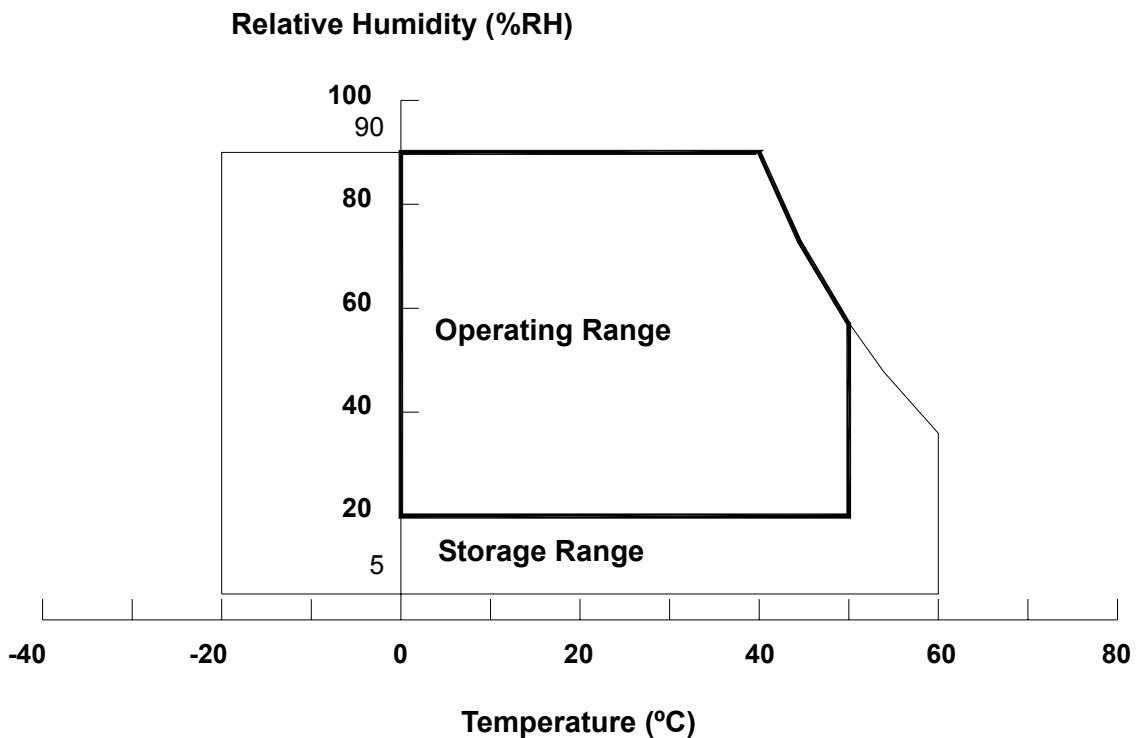
(c) No condensation.

Note (2) The temperature of panel display area surface should be 0 °C Min. and 60 °C Max.

Note (3) 2 ms, half sine wave, 1 time for  $\pm X$ ,  $\pm Y$ ,  $\pm Z$ .

Note (4) 10 ~ 500 Hz, 10 min, 1 time each X, Y, Z.

Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.



## 2.2 ELECTRICAL ABSOLUTE RATINGS

### 2.2.1 TFT LCD MODULE

| Item                 | Symbol          | Value |      | Unit | Note |
|----------------------|-----------------|-------|------|------|------|
|                      |                 | Min.  | Max. |      |      |
| Power Supply Voltage | V <sub>CC</sub> | -0.3  | +6.0 | V    | (1)  |
| Logic Input Voltage  | V <sub>IN</sub> | -0.3  | 4.3  | V    |      |

### 2.2.2 BACKLIGHT UNIT

| Item                                 | Symbo             | Test     | Min. | Type | Max. | Unit             | Note                              |
|--------------------------------------|-------------------|----------|------|------|------|------------------|-----------------------------------|
| Lamp Voltage                         | V <sub>L</sub>    | —        | 0    | —    | 3.0K | V <sub>RMS</sub> | (1), (2), I <sub>L</sub> = 4.7 mA |
| On/Off Control Voltage               | V <sub>BLON</sub> | —        | -0.3 | —    | 7    | V                |                                   |
| Internal/External PWM Select Voltage | V <sub>SEL</sub>  | —        |      |      |      |                  |                                   |
| Internal PWM Control Voltage         | V <sub>IPWM</sub> | —        |      |      |      |                  |                                   |
| External PWM Control Voltage         | V <sub>EPWM</sub> | —        |      |      |      |                  |                                   |
| Operating Temperature                | T <sub>OP</sub>   | 5~95% RH | 0    | —    | 75   | °C               | (3)                               |
| Storage Temperature                  | T <sub>ST</sub>   | 5~95% RH | -30  | —    | 80   | °C               |                                   |

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for lamp (Refer to 3.2 for further information).

Note (3) Protect inverters from moisture condensation and freezing.

## 3. ELECTRICAL CHARACTERISTICS

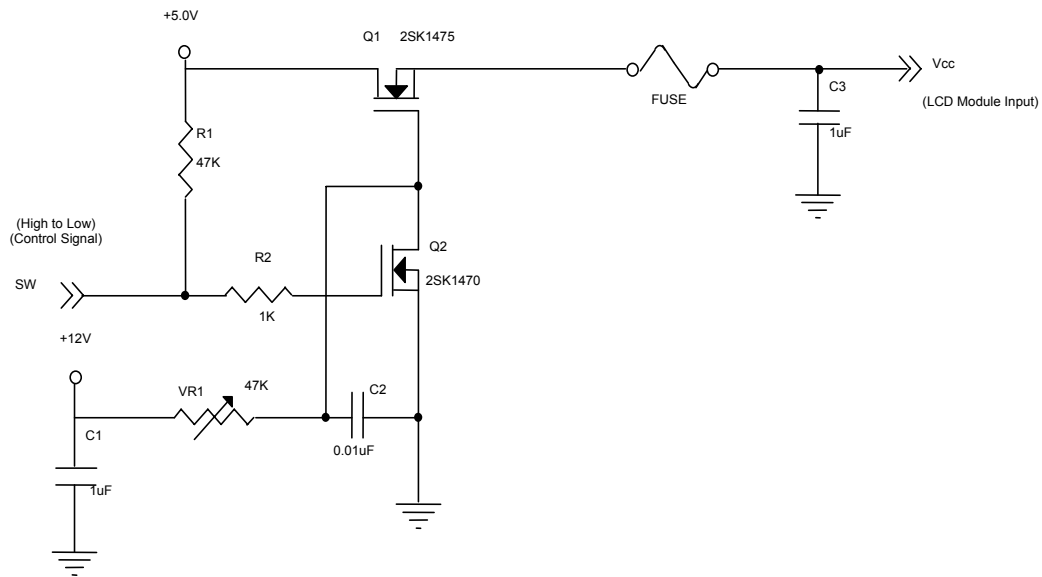
### 3.1 TFT LCD MODULE

T<sub>a</sub> = 25 ± 2 °C

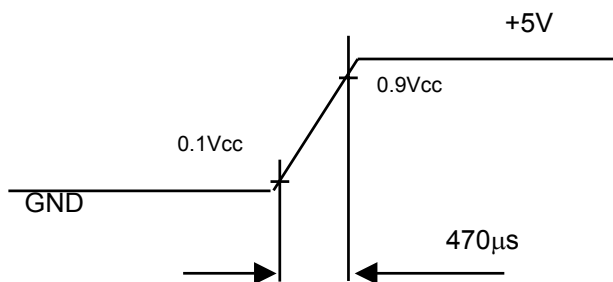
| Parameter                                      |                 | Symbol            | Value |      |       | Unit | Note |
|------------------------------------------------|-----------------|-------------------|-------|------|-------|------|------|
|                                                |                 |                   | Min.  | Typ. | Max.  |      |      |
| Power Supply Voltage                           |                 | V <sub>CC</sub>   | 4.5   | 5.0  | 5.5   | V    | -    |
| Ripple Voltage                                 |                 | V <sub>RP</sub>   | -     | -    | 200   | mV   | -    |
| Rush Current                                   |                 | I <sub>RUSH</sub> | -     | 2.1  | 3     | A    | (2)  |
| Power Supply Current                           | White           | I <sub>CC</sub>   | -     | 1.4  | -     | A    | (3)a |
|                                                | Black           |                   | -     | 1    | -     | A    | (3)b |
|                                                | Vertical Stripe |                   | -     | 1.2  | -     | A    | (3)c |
| LVDS differential input high threshold voltage |                 | V <sub>TH</sub>   | -     | -    | +100  | mV   |      |
| LVDS differential input low threshold voltage  |                 | V <sub>TL</sub>   | -100  | -    | -     | mV   |      |
| LVDS common input voltage                      |                 | V <sub>IC</sub>   | 1.125 | 1.25 | 1.375 | V    |      |
| Terminating Resistor                           |                 | R <sub>T</sub>    | -     | 100  | -     | ohm  |      |

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:



**Vcc rising time is 470 $\mu$ s**



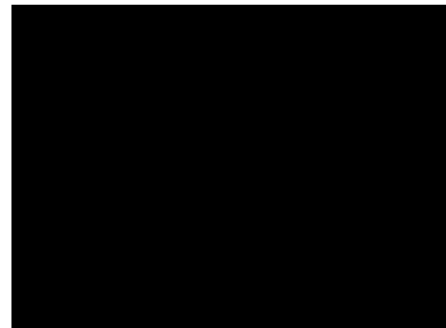
Note (3) The specified power supply current is under the conditions at  $V_{cc} = 5\text{ V}$ ,  $T_a = 25 \pm 2\text{ }^\circ\text{C}$ ,  $f_v = 60\text{ Hz}$ , whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

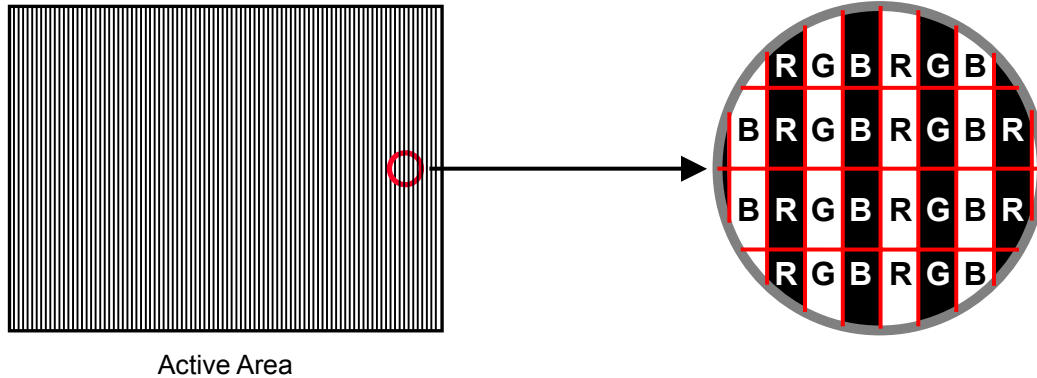
b. Black Pattern



Active Area



c. Vertical Stripe Pattern

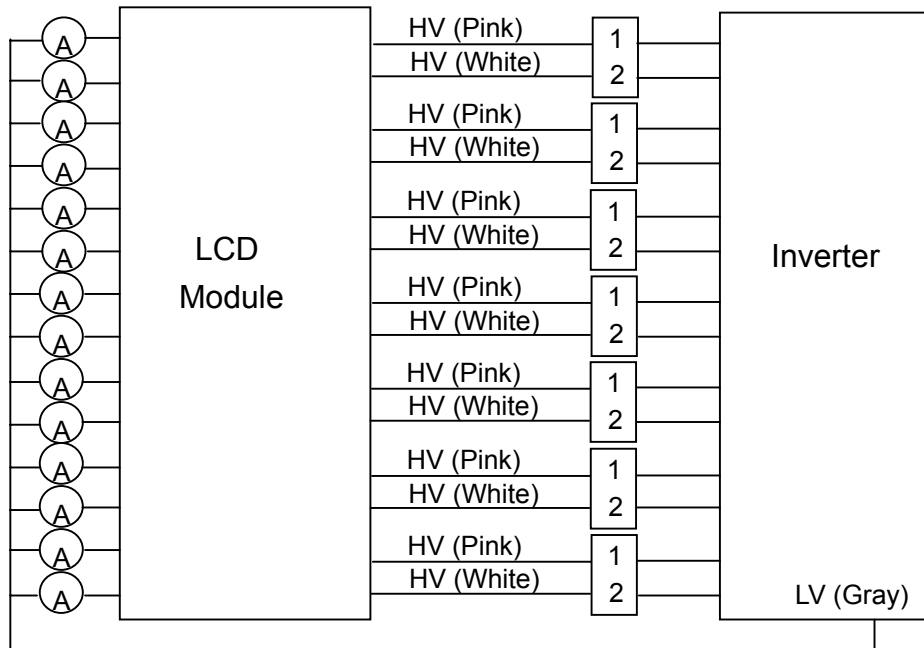


### 3.2 BACKLIGHT UNIT

 $T_a = 25 \pm 2 \text{ } ^\circ\text{C}$ 

| Parameter            | Symbol   | Value |      |      | Unit              | Note                                    |
|----------------------|----------|-------|------|------|-------------------|-----------------------------------------|
|                      |          | Min.  | Typ. | Max. |                   |                                         |
| Lamp Input Voltage   | $V_L$    | 1008  | 1120 | 1232 | $V_{RMS}$         | $I_L = 4.7 \text{ mA}$                  |
| Lamp Current         | $I_L$    | 4.4   | 4.7  | 5.0  | $\text{mA}_{RMS}$ | (1)                                     |
| Lamp Turn On Voltage | $V_s$    | 1200  | -    | 3000 | $V_{RMS}$         | (2), $T_a = 25 \text{ } ^\circ\text{C}$ |
|                      |          | 1790  | -    | 3000 | $V_{RMS}$         | (2), $T_a = 0 \text{ } ^\circ\text{C}$  |
| Operating Frequency  | $F_L$    | 54    | 56   | 58   | KHz               | (3)                                     |
| Lamp Life Time       | $L_{BL}$ | 50K   | -    | -    | Hrs               | (5)                                     |
| Power Consumption    | $P_L$    | -     | 92   | -    | W                 | (4), Inverter Input                     |

Note (1) Lamp current is measured by utilizing high frequency current meters as shown below:



Note (2) The voltage shown above should be applied to the lamp for more than 1 second after startup.

Otherwise the lamp may not be turned on.

Note (3) The lamp frequency may produce interference with horizontal synchronous frequency from the display, and this may cause line flow on the display. In order to avoid interference, the lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible.

Note (4)  $P_L = (\sum \text{lamp1-lamp14 } I_L \times V_L) / 0.8$ ,  $P_L$  is based on the inverter efficiency, which is 80%.

Note (5) The lifetime of a lamp is defined as the time in which it continues to operate under the condition  $T_a = 25 \pm 2^\circ\text{C}$  and  $I_L = (4.35) \sim (4.95)$  mArms until one of the following events occurs:

(a) When the brightness becomes equal or less than 50% of its original value.

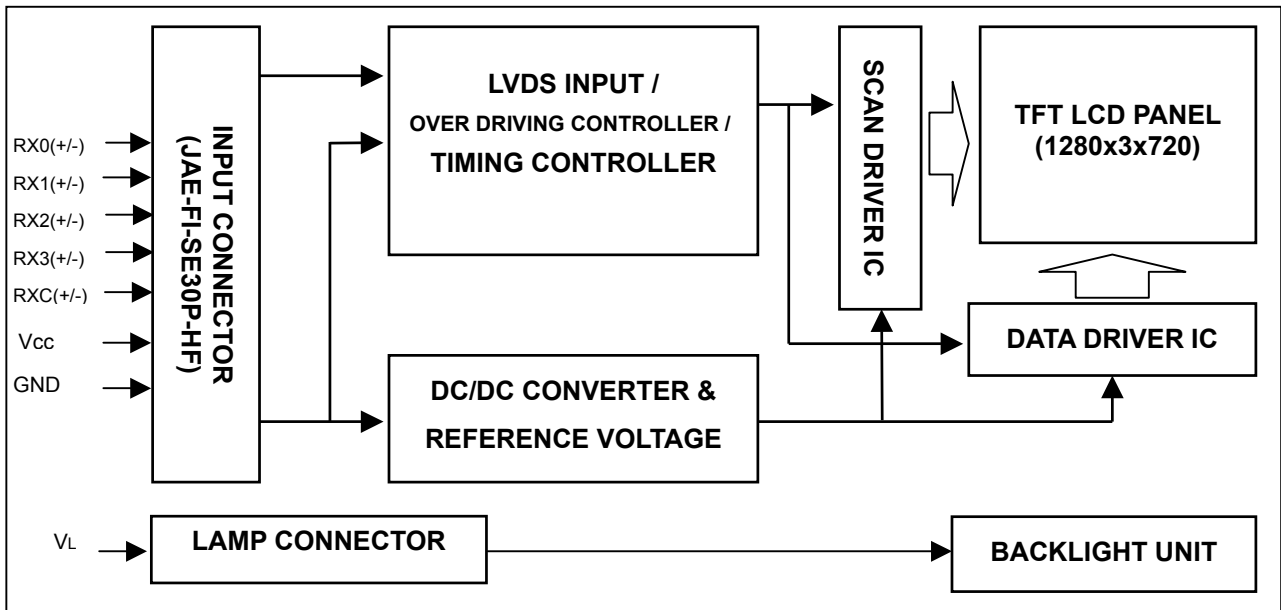
(b) When the effective discharge length becomes equal or less than 80% of its original value.

(Effective discharge length is defined as an area that has equal or more than 70% brightness compared to the brightness at the center point.)

Note (6) The waveform of the voltage output of inverter must be area-symmetric and the design of the inverter must have specifications for the modularized lamp. The performance of the Backlight, such as lifetime or brightness, is greatly influenced by the characteristics of the DC-AC inverter for the lamp. All the parameters of an inverter should be carefully designed to avoid producing too much current leakage from high voltage output of the inverter. When designing or ordering the inverter please make sure that a poor lighting caused by the mismatch of the Backlight and the inverter (miss-lighting, flicker, etc.) never occurs. If the above situation is confirmed, the module should be operated in the same manners when it is installed in your instrument.

## 4. BLOCK DIAGRAM

### 4.1 TFT LCD MODULE

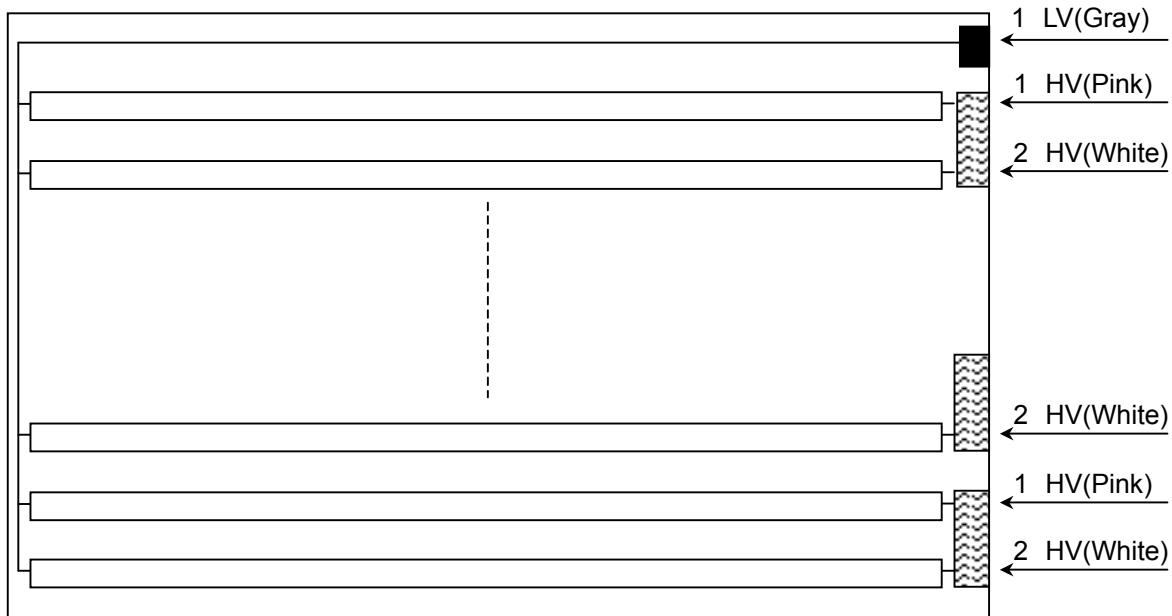


### 4.2 BACKLIGHT UNIT

Lamp connector

HV : BHR-03-VS-1(JST) \*7

LV : ZHR-2 (JST) \*1



## 5. INPUT TERMINAL PIN ASSIGNMENT

### 5.1 TFT LCD MODULE

| Pin | Name   | Description                                      |
|-----|--------|--------------------------------------------------|
| 1   | NC     | No Connection                                    |
| 2   | NC     | No Connection                                    |
| 3   | NC     | No Connection                                    |
| 4   | NC     | No Connection                                    |
| 5   | NC     | No Connection                                    |
| 6   | NC     | No Connection                                    |
| 7   | NC     | No Connection                                    |
| 8   | GND    | Ground                                           |
| 9   | RX3+   | Positive LVDS differential data input. Channel 3 |
| 10  | RX3-   | Negative LVDS differential data input. Channel 3 |
| 11  | RXCLK+ | Positive LVDS differential clock input.          |
| 12  | RXCLK- | Negative LVDS differential clock input.          |
| 13  | GND    | Ground                                           |
| 14  | GND    | Ground                                           |
| 15  | RX2+   | Positive LVDS differential data input. Channel 2 |
| 16  | RX2-   | Negative LVDS differential data input. Channel 2 |
| 17  | RX1+   | Positive LVDS differential data input. Channel 1 |
| 18  | RX1-   | Negative LVDS differential data input. Channel 1 |
| 19  | RX0+   | Positive LVDS differential data input. Channel 0 |
| 20  | RX0-   | Negative LVDS differential data input. Channel 0 |
| 21  | GND    | Ground                                           |
| 22  | GND    | Ground                                           |
| 23  | GND    | Ground                                           |
| 24  | GND    | Ground                                           |
| 25  | GND    | Ground                                           |
| 26  | VCC    | +5.0V power supply                               |
| 27  | VCC    | +5.0V power supply                               |
| 28  | VCC    | +5.0V power supply                               |
| 29  | VCC    | +5.0V power supply                               |
| 30  | VCC    | +5.0V power supply                               |

Note (1) Connector Part No.: FI-SE30P-HF (JAE)

Note (2) The first pixel is even.

### 5.2 BACKLIGHT UNIT

| Pin | Symbol | Description  | Color |
|-----|--------|--------------|-------|
| 1   | HV     | High Voltage | Pink  |
| 2   | HV     | High Voltage | White |

Note (1) Connector Part No.: BHR-03VS-1 (JST) or equivalent

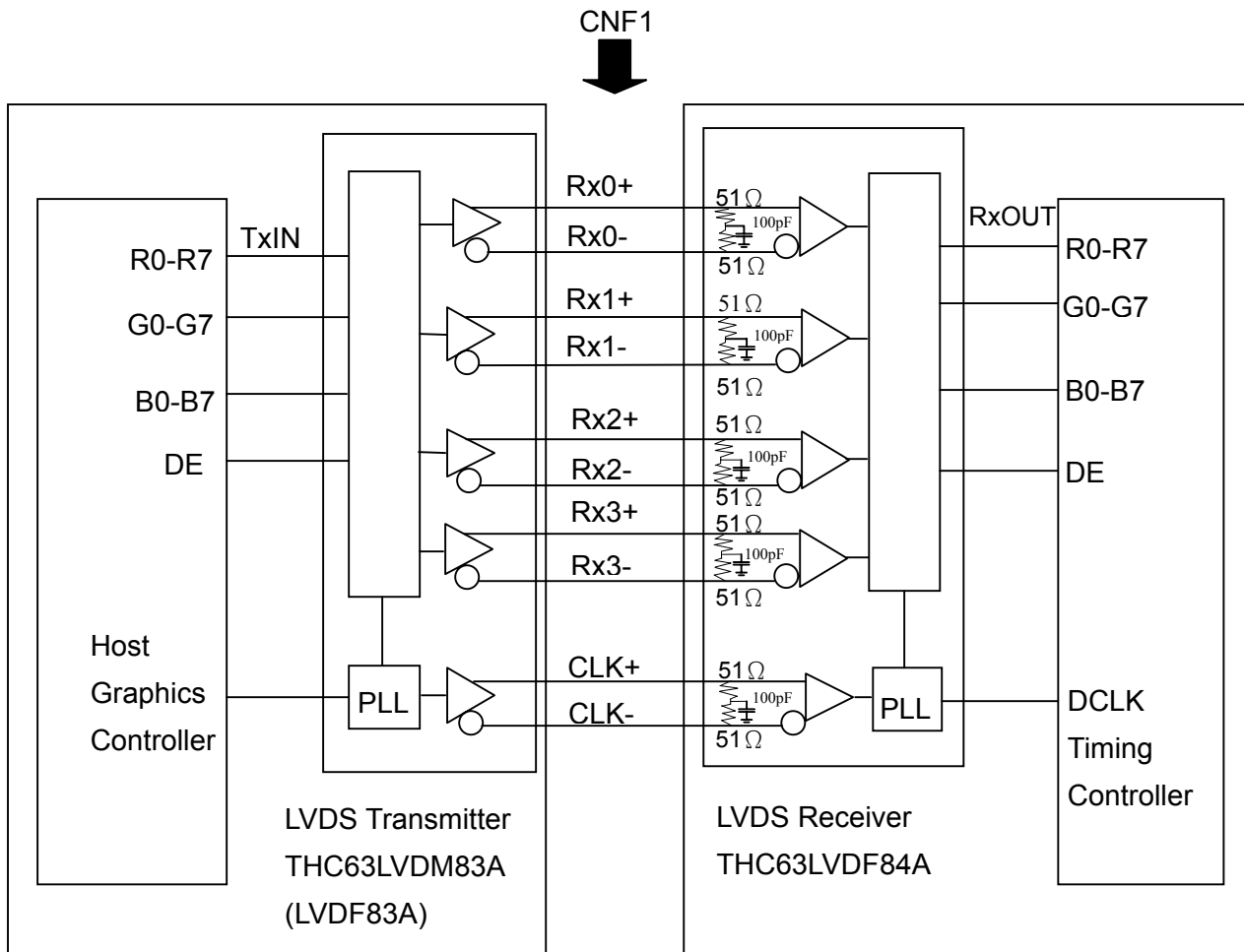
Note (2) User's connector Part No.: SM02(8.0)B-BHS-1TB (JST) or equivalent

| Pin | Symbol | Description   | Color |
|-----|--------|---------------|-------|
| 1   | LV     | Low Voltage   | Gray  |
| 2   | NC     | No Connection |       |

Note (1) Connector Part No.: ZHR-2 (JST) or equivalent

Note (2) User's connector Part No.: S2B-ZR-SM3A-TF (JST) or equivalent

### 5.3 BLOCK DIAGRAM OF INTERFACE



R0~R7 : Pixel R Data  
 G0~G7 : Pixel G Data  
 B0~B7 : Pixel B Data  
 DE : Display timing signal

- Notes:
- 1) The system must have the transmitter to drive the module.
  - 2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line when it is used differentially.

#### 5.4 LVDS INTERFACE

|       | SIGNAL | TRANSMITTER<br>THC63LVDM83A |          | INTERFACE CONNECTOR      |                        | RECEIVER<br>THC63LVDF84A |           | TFT CONTROL<br>INPUT |
|-------|--------|-----------------------------|----------|--------------------------|------------------------|--------------------------|-----------|----------------------|
|       |        | PIN                         | INPUT    | Host                     | TFT-LCD                | PIN                      | OUTPUT    |                      |
| 24bit | R0     | 51                          | TxIN0    | TA OUT0+                 | Rx 0+                  | 27                       | Rx OUT0   | R0                   |
|       | R1     | 52                          | TxIN1    |                          |                        | 29                       | Rx OUT1   | R1                   |
|       | R2     | 54                          | TxIN2    |                          |                        | 30                       | Rx OUT2   | R2                   |
|       | R3     | 55                          | TxIN3    |                          |                        | 32                       | Rx OUT3   | R3                   |
|       | R4     | 56                          | TxIN4    | TA OUT0-                 | Rx 0-                  | 33                       | Rx OUT4   | R4                   |
|       | R5     | 3                           | TxIN6    |                          |                        | 35                       | Rx OUT6   | R5                   |
|       | G0     | 4                           | TxIN7    |                          |                        | 37                       | Rx OUT7   | G0                   |
|       | G1     | 6                           | TxIN8    |                          |                        | 38                       | Rx OUT8   | G1                   |
|       | G2     | 7                           | TxIN9    | TA OUT1+                 | Rx 1+                  | 39                       | Rx OUT9   | G2                   |
|       | G3     | 11                          | TxIN12   |                          |                        | 43                       | Rx OUT12  | G3                   |
|       | G4     | 12                          | TxIN13   |                          |                        | 45                       | Rx OUT13  | G4                   |
|       | G5     | 14                          | TxIN14   |                          |                        | 46                       | Rx OUT14  | G5                   |
|       | B0     | 15                          | TxIN15   | TA OUT1-                 | Rx 1-                  | 47                       | Rx OUT15  | B0                   |
|       | B1     | 19                          | TxIN18   |                          |                        | 51                       | Rx OUT18  | B1                   |
|       | B2     | 20                          | TxIN19   |                          |                        | 53                       | Rx OUT19  | B2                   |
|       | B3     | 22                          | TxIN20   |                          |                        | 54                       | Rx OUT20  | B3                   |
|       | B4     | 23                          | TxIN21   | TA OUT2+                 | Rx 2+                  | 55                       | Rx OUT21  | B4                   |
|       | B5     | 24                          | TxIN22   |                          |                        | 1                        | Rx OUT22  | B5                   |
|       | DE     | 30                          | TxIN26   |                          |                        | 6                        | Rx OUT26  | DE                   |
|       | R6     | 50                          | TxIN27   |                          |                        | 7                        | Rx OUT27  | R6                   |
|       | R7     | 2                           | TxIN5    | TA OUT2-                 | Rx 2-                  | 34                       | Rx OUT5   | R7                   |
|       | G6     | 8                           | TxIN10   |                          |                        | 41                       | Rx OUT10  | G6                   |
|       | G7     | 10                          | TxIN11   |                          |                        | 42                       | Rx OUT11  | G7                   |
|       | B6     | 16                          | TxIN16   |                          |                        | 49                       | Rx OUT16  | B6                   |
|       | B7     | 18                          | TxIN17   | TA OUT3+                 | Rx 3+                  | 50                       | Rx OUT17  | B7                   |
|       | RSVD 1 | 25                          | TxIN23   |                          |                        | 2                        | Rx OUT23  | Not connect          |
|       | RSVD 2 | 27                          | TxIN24   |                          |                        | 3                        | Rx OUT24  | Not connect          |
|       | RSVD 3 | 28                          | TxIN25   |                          |                        | 5                        | Rx OUT25  | Not connect          |
|       | DCLK   | 31                          | TxCLK IN | TxCLK OUT+<br>TxCLK OUT- | RxCLK IN+<br>RxCLK IN- | 26                       | RxCLK OUT | DCLK                 |

R0~R7: Pixel R Data (7; MSB, 0; LSB)

G0~G7: Pixel G Data (7; MSB, 0; LSB)

B0~B7: Pixel B Data (7; MSB, 0; LSB)

DE : Display timing signal

Notes: 1)RSVD(reserved)pins on the transmitter shall be "H" or "L".

## 5.5 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

| Color               |                 | Data Signal |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |
|---------------------|-----------------|-------------|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|------|----|----|----|----|----|----|----|
|                     |                 | Red         |    |    |    |    |    |    |    | Green |    |    |    |    |    |    |    | Blue |    |    |    |    |    |    |    |
|                     |                 | R7          | R6 | R5 | R4 | R3 | R2 | R1 | R0 | R7    | R6 | G5 | G4 | G3 | G2 | G1 | G0 | R7   | R6 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Colors        | Black           | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Red             | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Green           | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Blue            | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | Cyan            | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | Magenta         | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | Yellow          | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | White           | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Gray Scale Of Red   | Red(0) / Dark   | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Red(1)          | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Red(2)          | 0           | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | Red(253)        | 1           | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Red(254)        | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Red(255)        | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| Gray Scale Of Green | Green(0) / Dark | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Green(1)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Green(2)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | Green(253)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Green(254)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Green(255)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| Gray Scale Of Blue  | Blue(0) / Dark  | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Blue(1)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 1  |
|                     | Blue(2)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 1  | 0  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | Blue(253)       | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  | 0  | 1  |
|                     | Blue(254)       | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 0  |
|                     | Blue(255)       | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |

Note (1) 0: Low Level Voltage, 1: High Level Voltage

## 6. INTERFACE TIMING

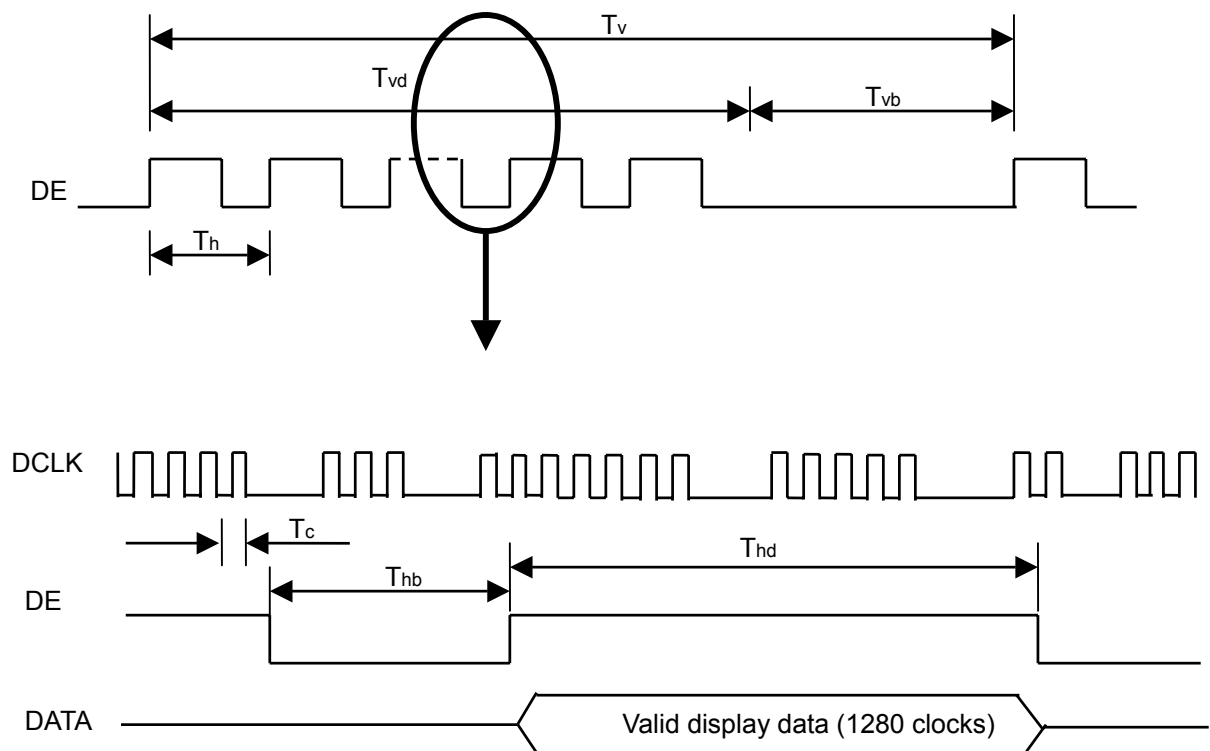
### 6.1 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

| Signal                         | Item       | Symbol   | Min. | Typ.  | Max. | Unit | Note                    |
|--------------------------------|------------|----------|------|-------|------|------|-------------------------|
| Clock                          | Frequency  | 1/Tc     | 70   | 74.25 | 80   | MHZ  | -                       |
| Vertical Active Display Term   | Frame Rate | Fr       | 48   | 60    | -    | Hz   | $T_v = T_{vd} + T_{vb}$ |
|                                | Total      | $T_v$    | 730  | 750   | 850  | Th   | -                       |
|                                | Display    | $T_{vd}$ | 720  | 720   | 720  | Th   | -                       |
|                                | Blank      | $T_{vb}$ | 10   | 30    | 130  | Th   | -                       |
| Horizontal Active Display Term | Total      | $T_h$    | 1450 | 1650  | 2000 | Tc   | $T_h = T_{hd} + T_{hb}$ |
|                                | Display    | $T_{hd}$ | 1280 | 1280  | 1280 | Tc   | -                       |
|                                | Blank      | $T_{hb}$ | 170  | 370   | 720  | Tc   | -                       |

Note: Because of this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

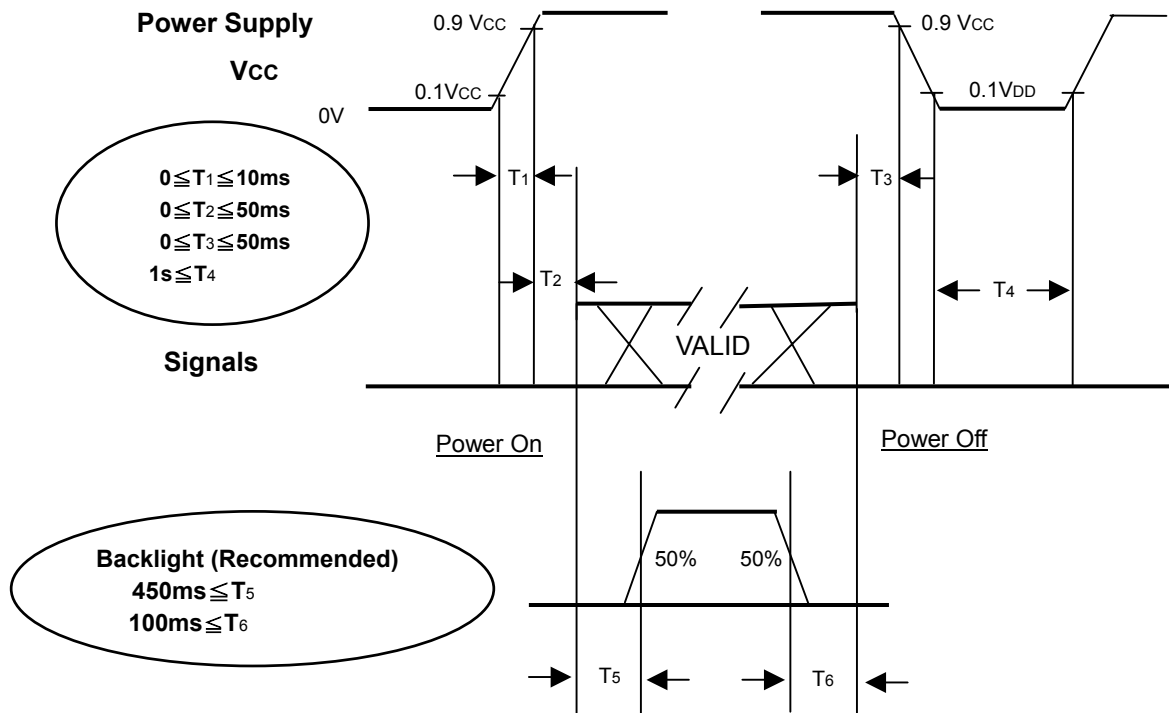
#### INPUT SIGNAL TIMING DIAGRAM





## 6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



**Power ON/OFF Sequence**

Note.

- (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.
- (2) Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation of the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.
- (3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.
- (4) T4 should be measured after the module has been fully discharged between power of and on period.
- (5) Interface signal shall not be kept at high impedance when the power is on.

## 7. OPTICAL CHARACTERISTICS

### 7.1 TEST CONDITIONS

| Item                       | Symbol                                                        | Value | Unit |
|----------------------------|---------------------------------------------------------------|-------|------|
| Ambient Temperature        | T <sub>a</sub>                                                | 25±2  | °C   |
| Ambient Humidity           | H <sub>a</sub>                                                | 50±10 | %RH  |
| Supply Voltage             | V <sub>CC</sub>                                               | 5.0   | V    |
| Input Signal               | According to typical value in "3. ELECTRICAL CHARACTERISTICS" |       |      |
| Inverter Current           | I <sub>L</sub>                                                | 4.7   | mA   |
| Inverter Driving Frequency | F <sub>L</sub>                                                | 56    | KHz  |
| Inverter                   |                                                               | --    |      |

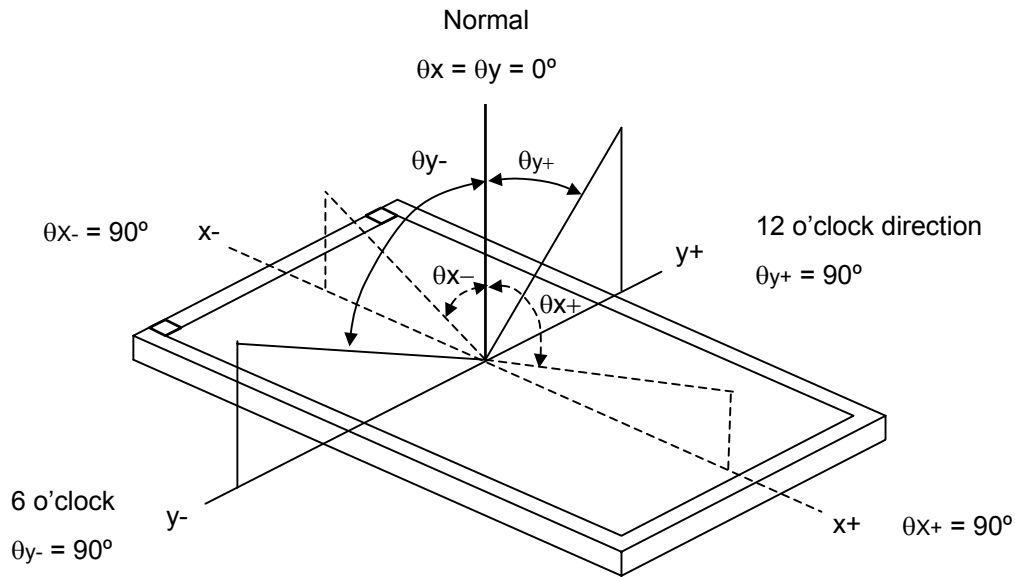
### 7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (7).

| Item                       |            | Symbol           | Condition                                                    | Min.  | Typ.  | Max.  | Unit              | Note                    |
|----------------------------|------------|------------------|--------------------------------------------------------------|-------|-------|-------|-------------------|-------------------------|
| Contrast Ratio             |            | CR               | $\theta_x=0^\circ, \theta_y=0^\circ$<br>Viewing Normal Angle | 400   | 600   | -     | -                 | Note(2)                 |
| Response Time              |            | T <sub>R</sub>   |                                                              | -     | 15    | 25    | ms                | Note(3)                 |
|                            |            | T <sub>F</sub>   |                                                              | -     | 10    | 20    | ms                |                         |
|                            |            | Gray to gray     |                                                              |       | 16.6  |       | ms                | Note(4)                 |
| Center Luminance of White  |            | L <sub>C</sub>   |                                                              | 450   | 550   | -     | cd/m <sup>2</sup> | Note(5)                 |
| Average Luminance of White |            | L <sub>AVE</sub> |                                                              | 400   | 450   | -     | cd/m <sup>2</sup> |                         |
| White Variation            |            | ΔW               |                                                              | -     | -     | 1.6   | -                 | Note(8)                 |
| Cross Talk                 |            | CT               |                                                              | -     | -     | 4.0   | %                 | Note(6)                 |
| Color Chromaticity         | Red        | R <sub>x</sub>   |                                                              | 0.616 | 0.646 | 0.676 | -                 |                         |
|                            |            | R <sub>y</sub>   |                                                              | 0.302 | 0.332 | 0.362 | -                 |                         |
|                            | Green      | G <sub>x</sub>   |                                                              | 0.239 | 0.269 | 0.299 | -                 |                         |
|                            |            | G <sub>y</sub>   |                                                              | 0.570 | 0.600 | 0.630 | -                 |                         |
|                            | Blue       | B <sub>x</sub>   |                                                              | 0.112 | 0.142 | 0.172 | -                 |                         |
|                            |            | B <sub>y</sub>   |                                                              | 0.042 | 0.072 | 0.102 | -                 |                         |
|                            | White      | W <sub>x</sub>   |                                                              | 0.255 | 0.285 | 0.315 | -                 |                         |
|                            |            | W <sub>y</sub>   |                                                              | 0.263 | 0.293 | 0.323 | -                 | 9, 300K                 |
| Viewing Angle              | Horizontal | θ <sub>x+</sub>  | CR≥10                                                        |       | 85    | -     | Deg.              | No gray scale inversion |
|                            |            | θ <sub>x-</sub>  |                                                              |       | 85    | -     |                   |                         |
|                            | Vertical   | θ <sub>y+</sub>  |                                                              |       | 85    | -     |                   |                         |
|                            |            | θ <sub>y-</sub>  |                                                              |       | 85    | -     |                   |                         |

Note (1) Definition of Viewing Angle ( $\theta_x$ ,  $\theta_y$ ):

Viewing angles are measured by Eldim EZ-Contrast 160R



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

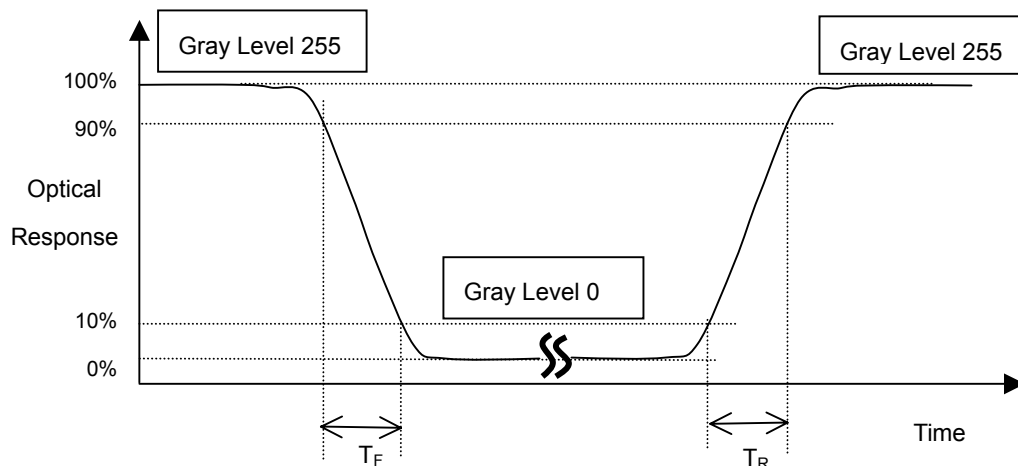
$L_{255}$ : Luminance of gray level 255

$L_0$ : Luminance of gray level 0

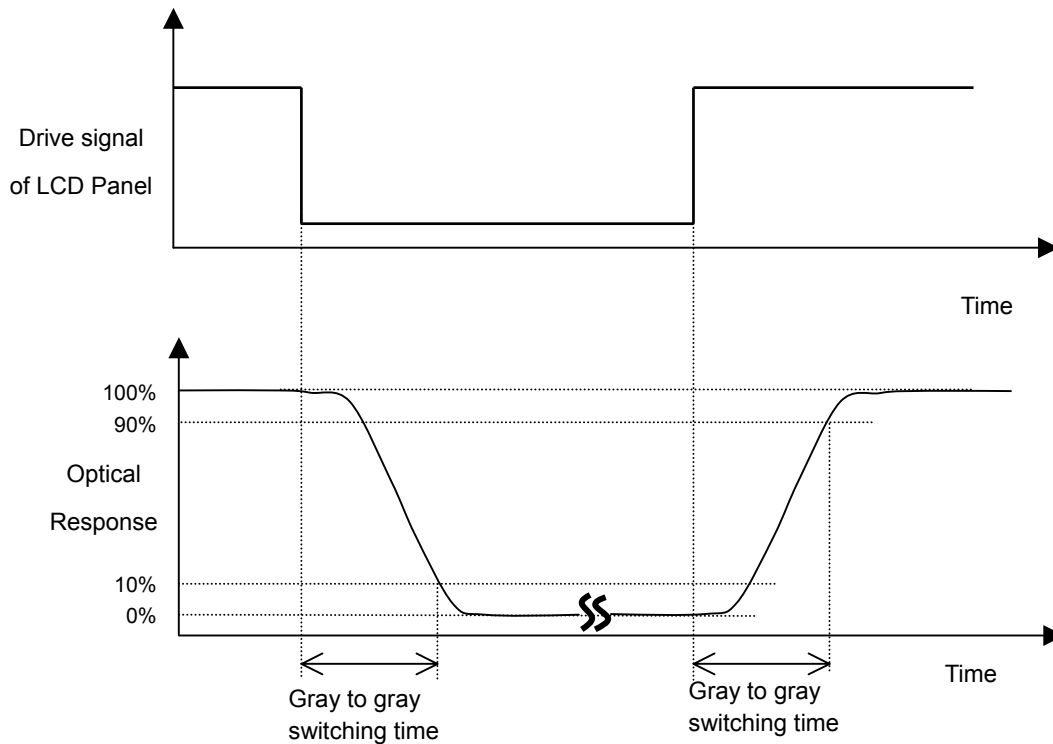
$$CR = CR(5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at the figure in Note (8).

Note (3) Definition of Response Time ( $T_R$ ,  $T_F$ ):



Note (4) Definition of Gray to Gray Switching Time:



The driving signal means the signal of gray level 0,63,127,191,255.

Note (5) Definition of Luminance of White ( $L_C$ ,  $L_{AVE}$ ):

Measure the luminance of gray level 255 at center point and 5 points

$$L_C = L(5)$$

$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

$L(x)$  is corresponding to the luminance of the point X at the figure in Note (8).

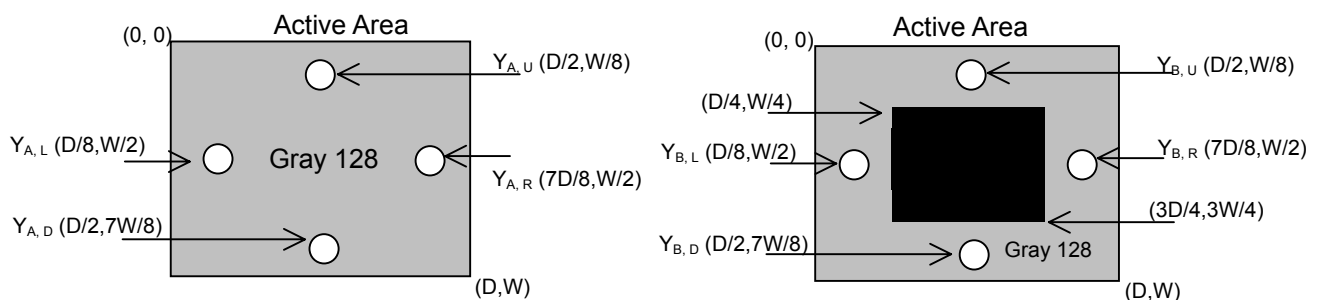
Note (6) Definition of Cross Talk (CT):

$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

Where:

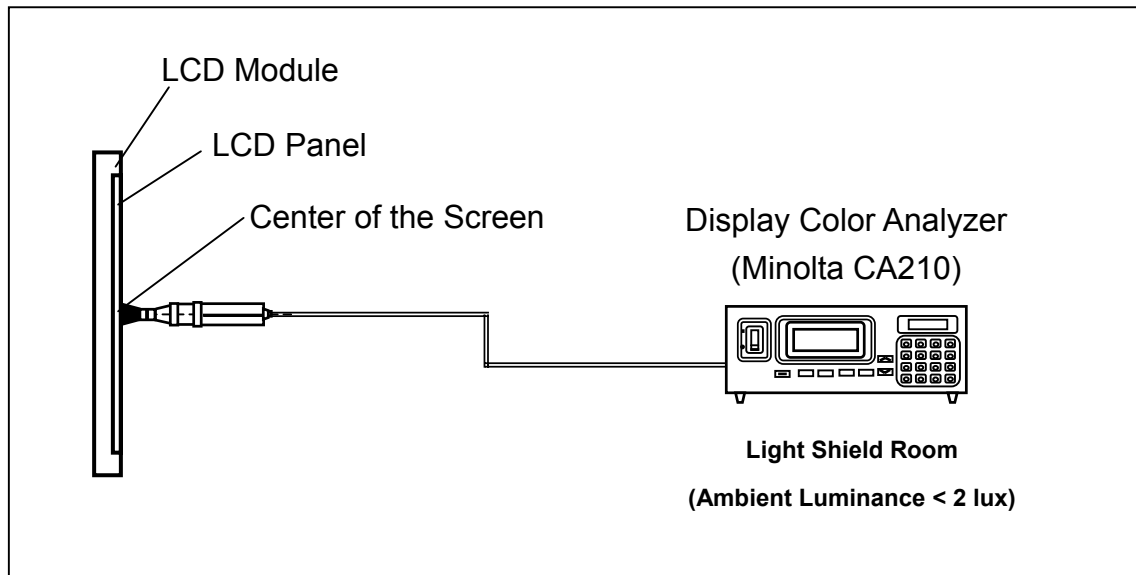
$Y_A$  = Luminance of measured location without gray level 0 pattern ( $\text{cd/m}^2$ )

$Y_B$  = Luminance of measured location with gray level 0 pattern ( $\text{cd/m}^2$ )



Note (7) Measurement Setup:

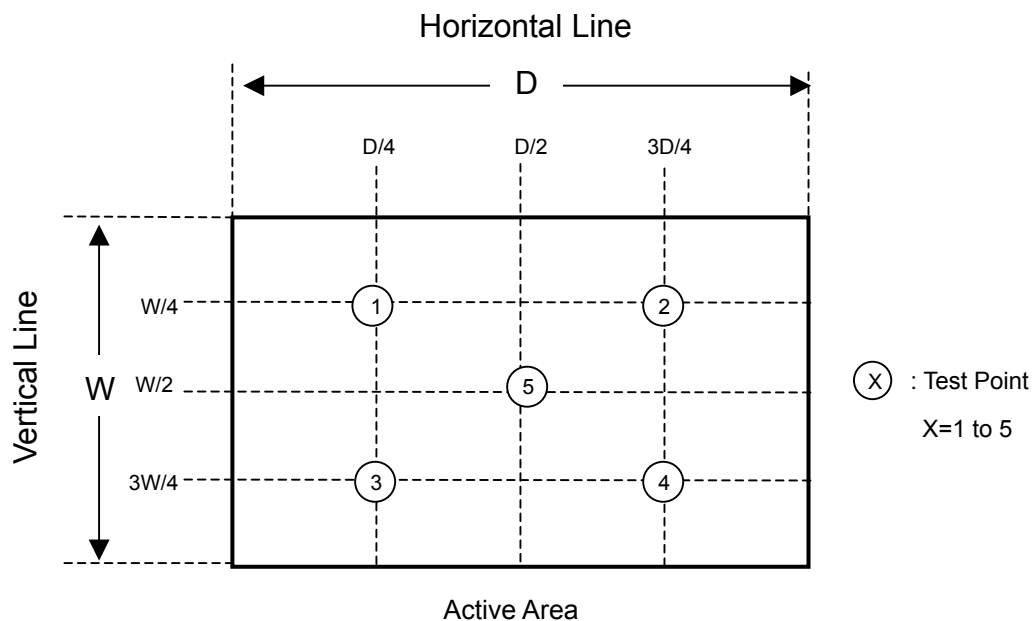
The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.



Note (8) Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \text{Maximum} [L(1), L(2), L(3), L(4), L(5)] / \text{Minimum} [L(1), L(2), L(3), L(4), L(5)]$$



## 8. PACKAGING

### 8.1 PACKING SPECIFICATIONS

- (1) 4 LCD TV Modules / Carton
- (2) Carton Dimensions : 742(L) X 327 (W) X 510 (H)
- (3) Weight : Approximately 19Kg ( 4 Modules Per Carton)

### 8.2 PACKING METHOD

Figures 8-1 and 8-2 are the packing method

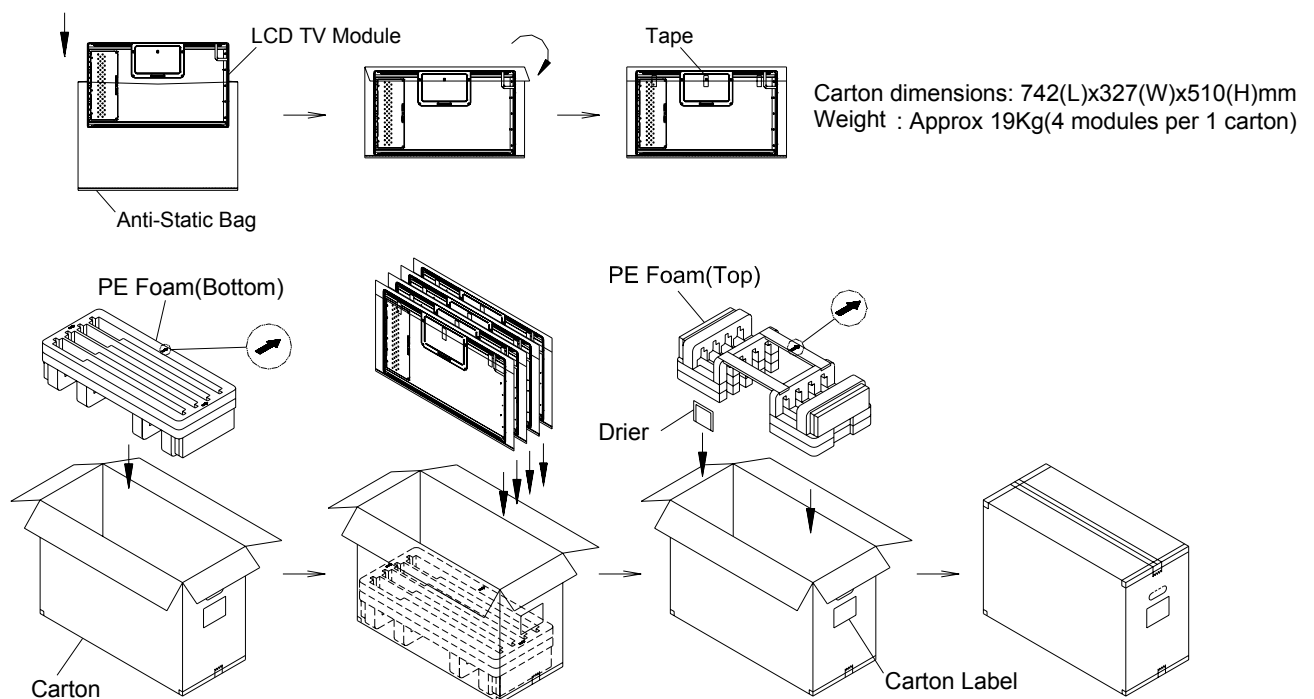


Figure.8-1 packing method

Corner Protector:L1020\*50mm\*50mm

Pallet:L1100\*W1100\*H135mm

Bottom Cap:L1100\*W1100\*H120mm

Pallet Stack:L1100\*W1100\*H1163mm

Gross Weight:180kg

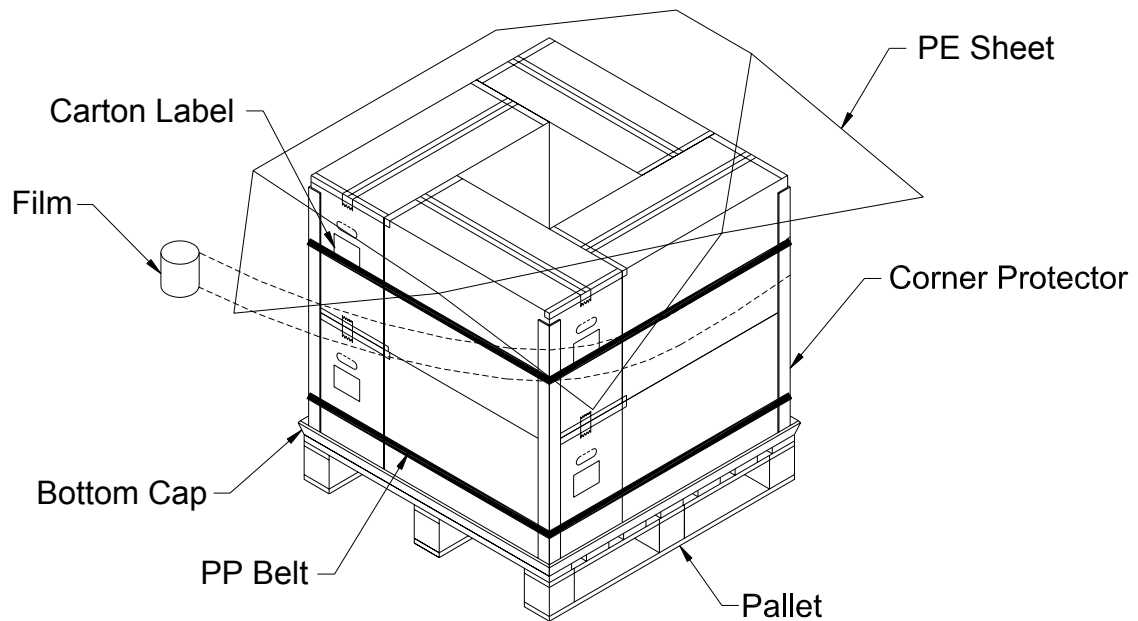
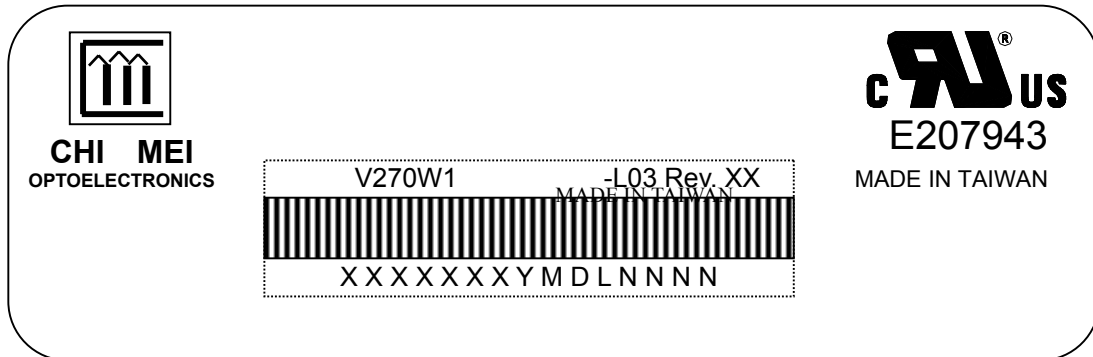


Figure. 8-2 packing method

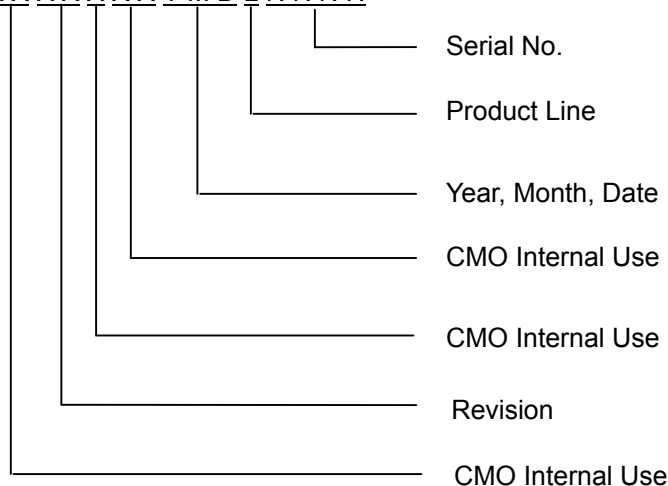
## 9. DEFINITION OF LABELS

### 9.1 CMO MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



- (a) Model Name: V270W1-L03
- (b) Revision: Rev. XX, for example: A0, A1... B1, B2... or C1, C2...etc.
- (c) Serial ID: X X X X X X Y M D L N N N N



Serial ID includes the information as below:

- (a) Manufactured Date: Year: 1~9, for 2000~2009  
Month: 1~9, A~C, for Jan. ~ Dec.  
Day: 1~9, A~Y, for 1<sup>st</sup> to 31<sup>st</sup>, exclude I ,O, and U.
- (b) Revision Code: Cover all the change
- (c) Serial No.: Manufacturing sequence of product
- (d) Product Line: 1 -> Line1, 2 -> Line 2, ...etc.



## 10. PRECAUTIONS

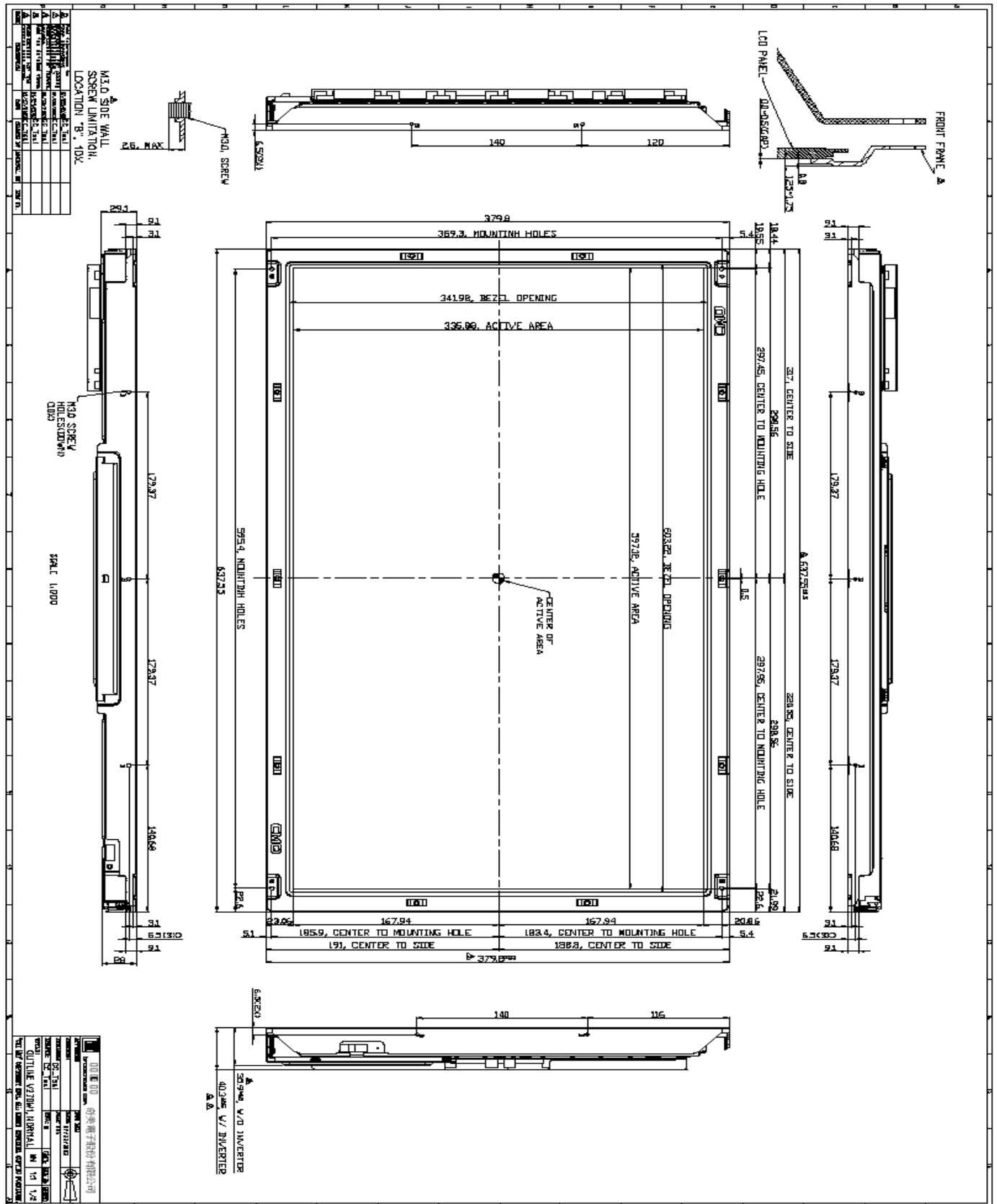
### 10.1 ASSEMBLY AND HANDLING PRECAUTIONS

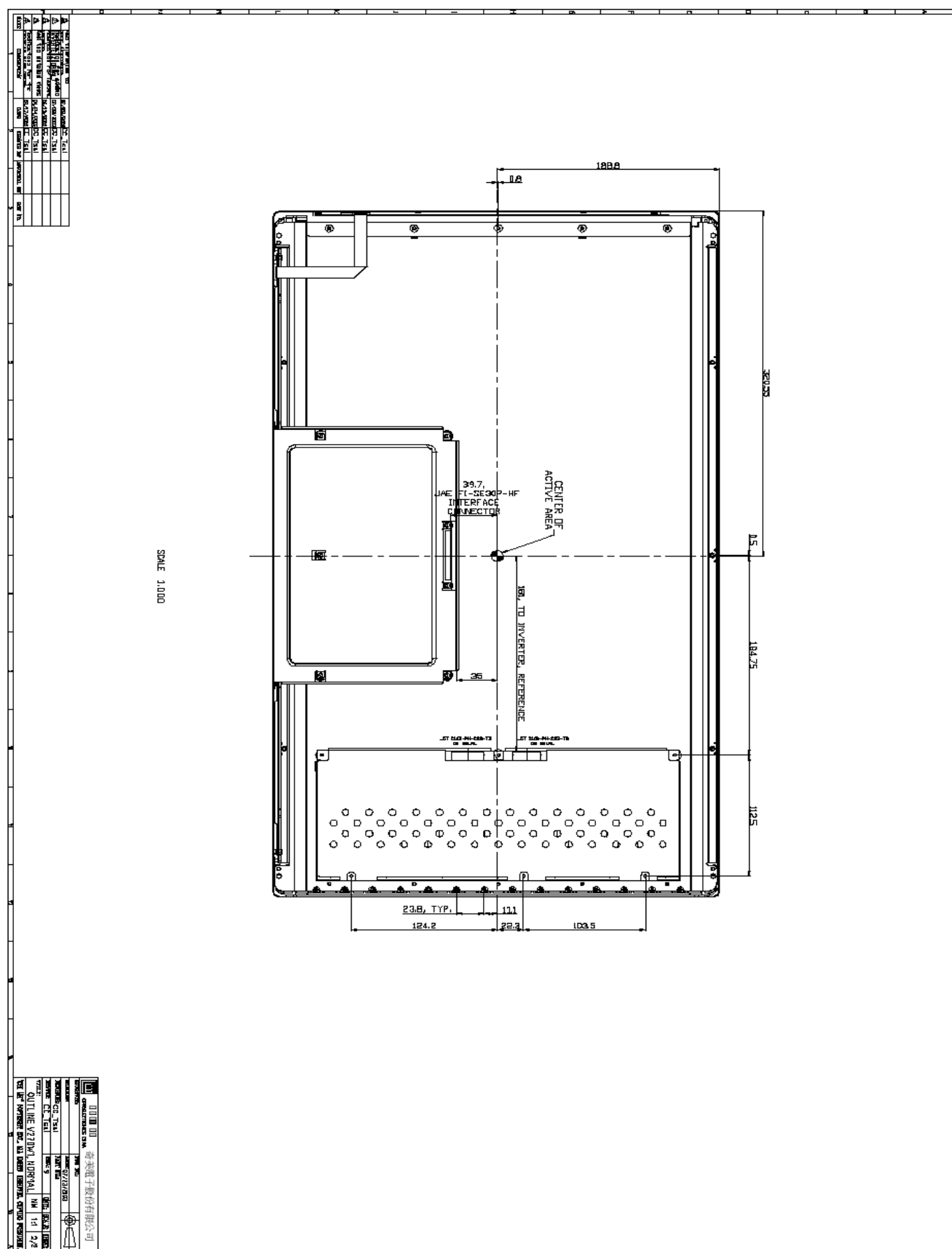
- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) It is recommended to assemble or to install a module into the user's system in clean working areas.  
The dust and oil may cause electrical short or worsen the polarizer.
- (3) Do not apply pressure or impulse to the module to prevent the damage of LCD panel and Backlight.
- (4) Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.
- (5) Do not plug in or pull out the I/F connector while the module is in operation.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) Moisture can easily penetrate into LCD module and may cause the damage during operation.
- (9) High temperature or humidity may deteriorate the performance of LCD module. Please store LCD modules in the specified storage conditions.
- (10) When ambient temperature is lower than 10°C, the display quality might be reduced. For example, the response time will become slow, and the starting voltage of CCFL will be higher than that of room temperature.

### 10.2 SAFETY PRECAUTIONS

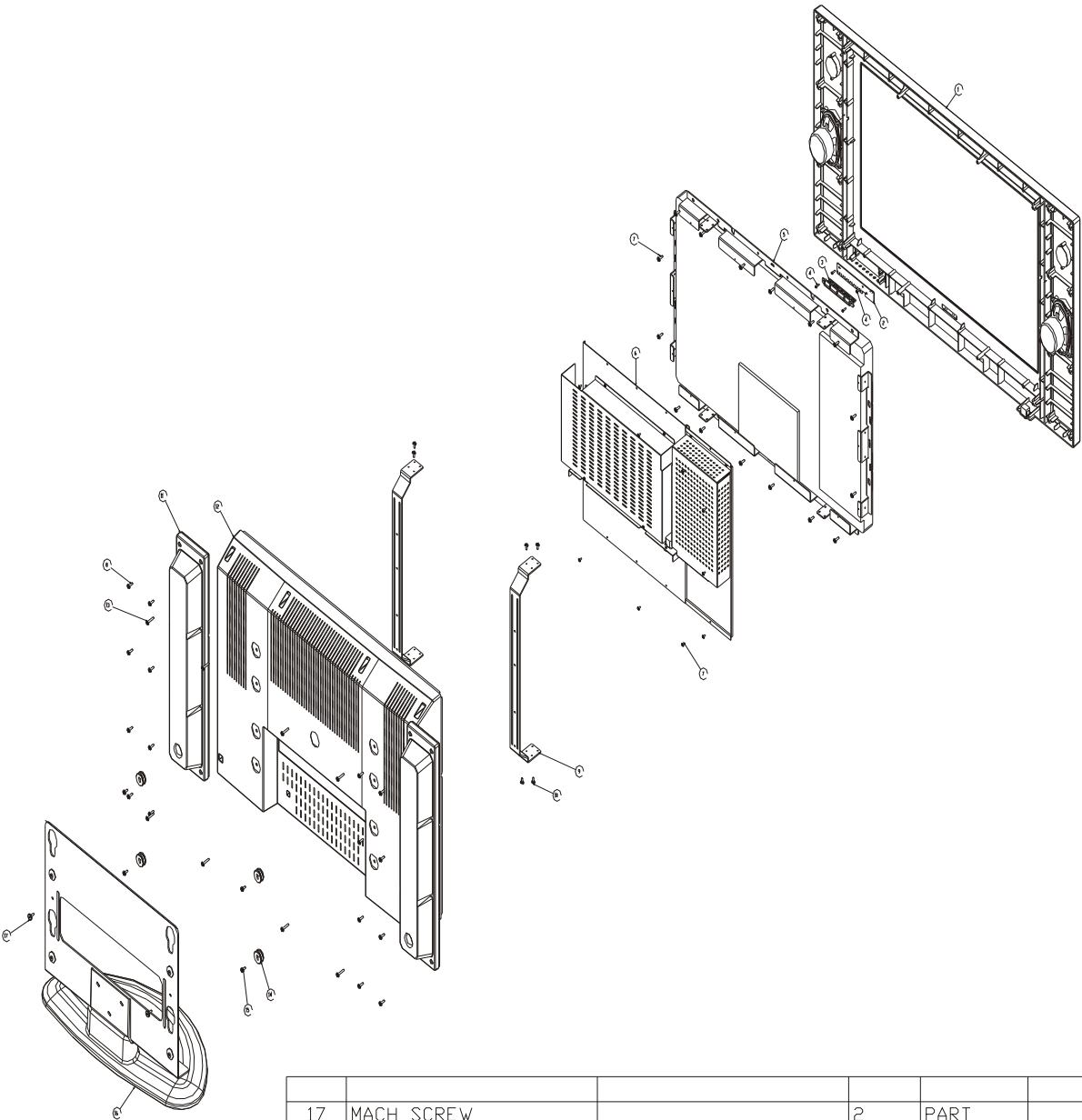
- (1) The startup voltage of a Backlight is approximately 1000 Volts. It may cause an electrical shock while assembling with the inverter. Do not disassemble the module or insert anything into the Backlight unit.
- (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (3) After the module's end of life, it is not harmful in case of normal operation and storage.

## 11. MECHANICAL CHARACTERISTICS





Exploded View Diagram



|      |                    |         |      |          |        |
|------|--------------------|---------|------|----------|--------|
| 17   | MACH SCREW         |         | 2    | PART     |        |
| 16   | SEAT_ASS           |         | 1    | ASSEMBLY |        |
| -    | SPCKET_PVC_PLATE   |         | 1    | PART     |        |
| 15   | MACH SCREW         |         | 4    | PART     |        |
| 14   | BKT_1              |         | 4    | PART     |        |
| 13   | SELF TAPPING SCREW |         | 8    | PART     |        |
| 12   | BACK_CAB_26_1      |         | 1    | PART     |        |
| 11   | SPK_БПХ_Б1         |         | 2    | PART     |        |
| 10   | MACH SCREW         |         | 8    | PART     |        |
| 9    | MTG_BKT_26_2       |         | 2    | PART     |        |
| 8    | SELF TAPPING SCREW |         | 32   | PART     |        |
| 7    | MACH SCREW         |         | 9    | PART     |        |
| 6    | MAIN_PCB_MTG_ASS_2 |         | 1    | ASSEMBLY |        |
| 5    | 27PANEL_ASS        |         | 1    | ASSEMBLY |        |
| 4    | SELF TAPPING SCREW |         | 4    | PART     |        |
| 3    | F_KEY_L26_1        |         | 1    | PART     |        |
| 2    | KEY_PCB_ASS_26_1   |         | 1    | ASSEMBLY |        |
| 1    | FRPNT_CAB_ASS_LC27 |         | 1    | ASSEMBLY |        |
| ITEM | DESCRIPTION        | PART NP | QTY. | TYPE     | REMARK |

# SPARE PART LIST

LC26HABCUSXM1-A03

AKAI

MICO

USA

LCT2715(FULL PIP)

| Item                 | Component       | Description/Country Origin           | Unit | Quantity |
|----------------------|-----------------|--------------------------------------|------|----------|
| <b>一, ELECT PART</b> |                 |                                      |      |          |
| 1                    | E1301-041090    | CAPACITOR EC V A SAIL 100M 16DC T05  | PCS  | 1        |
| 2                    | E1501-001001    | RESISTOR CBF H 1/6W 100J T52         | PCS  | 1        |
| 3                    | E1501-001004    | RESISTOR CBF H 1/6W 103J T52         | PCS  | 7        |
| 4                    | E2509-094001    | DIODE LED A D3.0 GR/RD (LT036        | PCS  | 1        |
| 5                    | E2701-023002    | DETECTOR IR AT138A                   | PCS  | 1        |
| 6                    | E3101-171001    | PLUG V HX2007(PH)-12A P2.0 12P WHT   | PCS  | 1        |
| 7                    | E3204-023001    | SOCKET AC HF-301 FOR 26LA            | PCS  | 1        |
| 8                    | E3403-001001    | TUBE SHRINKABLE D30.0 BLK 600V       | M    | 0.04     |
| 9                    | E3403-004001    | TUBE SUMITUBE D5.0 BLK 600V          | M    | 0.105    |
| 10                   | E3403-005001    | TUBE SHRINKABLE D20.0 BLK            | M    | 0.03     |
| 11                   | E3421-229007    | WIRE ASSY 1H3.96-2KN3 0N2 L400 CJ    | PCS  | 1        |
| 12                   | E3421-925029    | WIRE ASSY PH2.0-12Y/12Y L=550MM KEY  | PCS  | 1        |
| 13                   | E3421-925030    | WIRE ASSY PH2.0-8Y/8Y 5V/12V L=220   | PCS  | 1        |
| 14                   | E3421-925031    | WIRE ASSY PH2.0-5Y/5Y L=250MM 5VSB   | PCS  | 1        |
| 15                   | E3421-925032    | WIRE ASSY PH2.0-4Y/4Y L=450MM AMP2   | PCS  | 1        |
| 16                   | E3421-925033    | WIRE ASSY PH2.0-12Y/12Y L=250MM IN   | PCS  | 1        |
| 17                   | E3421-925034    | WIRE ASSY PH2.0-10Y/10Y L=250MM INV  | PCS  | 1        |
| 18                   | E3421-925035    | WIRE ASSY PH2.0-4Y/4Y L=100MM AUDI   | PCS  | 1        |
| 19                   | E3421-925036    | WIRE ASSY PH2.0-12Y/12Y L=280MM TU   | PCS  | 1        |
| 20                   | E3421-925037    | WIRE ASSY TTJC3-2Y L=450MM SPK-R     | PCS  | 1        |
| 21                   | E3421-925038    | WIRE ASSY TJC3-2Y L=850MM SPK-L      | PCS  | 1        |
| 22                   | E3421-925039    | WIRE ASSY LVDS L=300MM 30P/30P       | PCS  | 1        |
| 23                   | E3421-925040    | WIRE ASSY TJC3-6Y/6Y L=350MM POWER   | PCS  | 1        |
| 24                   | E3421-941001    | WIRE ASSY 1KN5-2TKN0 45 L110 BJ      | PCS  | 1        |
| 25                   | E3451-000406    | WIRE WD 1672#20 RED L=250MM          | PCS  | 1        |
| 26                   | E3451-000407    | WIRE WD 1672#20 BLACK L=250MM        | PCS  | 1        |
| 27                   | E3731-052020    | PCB KEY V0 124.5X20.5MM W 1.6MM 2 LA | PCS  | 1        |
| 28                   | E4101-027001    | SWITCH POW MR-22-N2BB-F2 ROCKET      | PCS  | 1        |
| 29                   | E4102-044001    | SWITCH TACT H 6*6*5W                 | PCS  | 7        |
| 30                   | E4801-123001    | SPEAKER 8 OHM 10W D2.5X4" YDT711 (SG | PCS  | 2        |
| 31                   | E6203-024001    | DISPLAY LCD 27" V270W1-L03           | PCS  | 1        |
| 32                   | E7802-004001    | PCB ASSY MAIN BOARD FOR 27" LCD MICO | SET  | 1        |
| 33                   | E7802-004002    | PCB ASSY POWER200 BOARD FOR 27" LCD  | SET  | 1        |
| 34                   | E7802-004003    | PCB ASSY TUNER AMP BOARD FOR 27" LCD | SET  | 1        |
| <b>二, MECH PART</b>  |                 |                                      |      |          |
| 1                    | 200-26LA21-04AV | CABINET FRONT AKAI BLK LCT2715 (MICO | PCS  | 1        |
| 2                    | 202-26LA11-01AV | BACK CABINET 26LA A (470+70%)        | PCS  | 1        |
| 3                    | 206-26LA01-01PV | THE BACK COVER SPEAKER 26LA P (470   | PCS  | 2        |
| 4                    | 230-26LA11-02RV | STAND COVER 26LA BLK LCT2715 R       | PCS  | 1        |
| 5                    | 269-290803-01S  | POWER LENS (D) 2908                  | PCS  | 1        |
| 6                    | 269-290804-01L  | SENSOR LENS (D) 2908                 | PCS  | 1        |
| 7                    | 277-26LA01-01S  | FUNCTION KNOB 26LA                   | PCS  | 1        |
| 8                    | 361-101261-01   | CABLE TIE                            | PCS  | 5        |

|    |                  |                                       |     |        |
|----|------------------|---------------------------------------|-----|--------|
| 9  | 370-42D101-01    | RUBBER FOOT 20X20X7.0MM 42D1          | PCS | 4      |
| 10 | 379-972501-01Y   | SPECIAL RUBBER PARTS SPK 9725         | PCS | 8      |
| 11 | 379-972502-01Y   | SPECIAL RUBBER PARTS 9725             | PCS | 8      |
| 12 | 388-L27AB01-01H  | POWER PLATE AKAI LC26HAB H            | PCS | 1      |
| 13 | 389-26LA01-07H   | PVC PLATE AKAI FOR TERMINAL SHEET LC  | PCS | 1      |
| 14 | 389-26LA02-01H   | OTHER PVC PLATE 26LA                  | PCS | 2      |
| 15 | 389-27LA01-01H   | PVC SHEET FOR BACK CABINET GATE       | PCS | 1      |
| 16 | 423-27LA07-01    | STAND SUPPORT PLATE SPCC 27LA         | PCS | 1      |
| 17 | 423-27LA08-01    | METAL PLATE FOR STAND SUPPORT PLATE   | PCS | 1      |
| 18 | 423-27LA09-01    | METAL PLATE FOR WALL BRACKET 27LA     | PCS | 2      |
| 19 | 426-27LA11-01    | SUPPORT BRACKET FOR POWER JACK 27LA   | PCS | 1      |
| 20 | 428-27LA11-01    | MAIN METAL PLATE FOR PANEL 27LA       | PCS | 1      |
| 21 | 436-27LA01-01    | BACK TERMINAL SHEET 27LA              | PCS | 1      |
| 22 | 449-27LA01-01    | METAL PLATE FOR STAND BASE            | PCS | 1      |
| 23 | 481-27LA01-01    | SHIELD COVER FOR MAIN PCB 27LA TINPL  | PCS | 1      |
| 24 | 481-27LA02-01    | SHIELD COVER FOR POWER PCB 27LA TINP  | PCS | 1      |
| 25 | 486-M32111-01    | NAME PLATE M AKAI                     | PCS | 1      |
| 26 | 521-100105-01    | FELT PAPER 100X10X0.5                 | PCS | 10     |
| 27 | 521-150105-01    | FELT PAPER 150X10X0.5                 | PCS | 25     |
| 28 | 563-119-         | SERIAL NO. LABEL                      | PCS | 1      |
| 29 | 579-LC2701-03    | UPC LABEL (50X23)MM OF UNIT LCT2715(  | PCS | 1      |
| 30 | 579-LC2702-03    | UPC LABEL OF G/B LCT2715 MICO)        | PCS | 2      |
| 31 | 580-L26ABHM-TU01 | L I B E FOR AKAI LC26HAB CMO MICO USA | PCS | 1      |
| 32 | 590-LC2701-03    | INSERTION CARD AKAI LC26HAB           | PCS | 1      |
| 33 | 590-LC2701-04    | WARRANTY CARD AKAI LCT2715 216X279MM  | PCS | 1      |
| 34 | 601-305008-00    | MACH.SCREW CTS 3X8 BZN +              | PCS | 3      |
| 35 | 601-305010-00    | MACH.SCREW CTS 3X10 BZN +             | PCS | 5      |
| 36 | 602-305004-10    | MACH. SCREW PAN-WASHER M3X4 NIP +H    | PCS | 30     |
| 37 | 602-305008-10    | MACH.SCREW WHR 3X8 NIP +              | PCS | 12     |
| 38 | 604-305022-00    | MACH. SCREW BINDING M3X22MM B ZNP +H  | PCS | 2      |
| 39 | 604-508022-00    | MACH. SCREW BINDING M5X22MM B ZNP +H  | PCS | 8      |
| 1  | 610-300210-10    | TS RBD3X10 A NIP +H                   | PCS | 11     |
| 2  | 614-300108-10    | S-TAP SCREW BID 3.0X8                 | PCS | 4      |
| 3  | 614-400412-10    | S-TAP.SCREW BID 4X12 D NIP +          | PCS | 40     |
| 4  | 614-400420-10    | S-TAP.SCREW BID 4X20 T NIP +          | PCS | 8      |
| 5  | 615-400414-10    | S-TAP.SCREW BWH 4X14 T NIP +          | PCS | 8      |
| 6  | 802-005005-20    | TAPE 2S T4000 5X50M                   | RLS | 0.0198 |

### 三, PACKING

|   |                |                                     |     |   |
|---|----------------|-------------------------------------|-----|---|
| 1 | 300-27AB01-02C | POLYFOAM TOP 27AB                   | PCS | 1 |
| 2 | 300-27AB02-02C | POLYFOAM BOTTOM 27AB                | PCS | 1 |
| 3 | 310-111404-07V | POLYBAG 11"X14"X0.04                | PCS | 1 |
| 4 | 310-453510-07V | BAG LAMIFILM                        | PCS | 1 |
| 5 | 510-27LA02-03K | GIFT BOX AKAI LCT2715 (MICO) K      | PCS | 1 |
| 7 | E3404-157001   | AC CORD UL 1.88M MET-4D7+SJT 16AWG/ | PCS | 1 |
| 8 | E7301-010002   | BATTERY AAA R03P1.5V <2>            | PCS | 2 |
| 9 | E7501-051004   | REMOTE CRTL FOR 27" USA LCT2716     | SET | 1 |

# If you forget your V-Chip Password

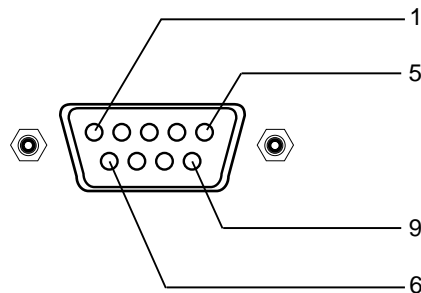
- Omnipotence V-Chip Password: **0000**.
- Press **MENU** button.
- Press **LEFT RIGHT** buttons to highlight "MISC" Menu.
- Press **Up, Down** buttons to highlight "Parental".
- Press **ENTER** button to pop up "Input your Password Please".
- Use the **Number buttons** (0~9) to enter an omnipotence Password.
- Press **ENTER** button to confirm and you can select "CHANGE PASSWORD".
- Suggest: Change to your familiar Password again.

## Software upgrade

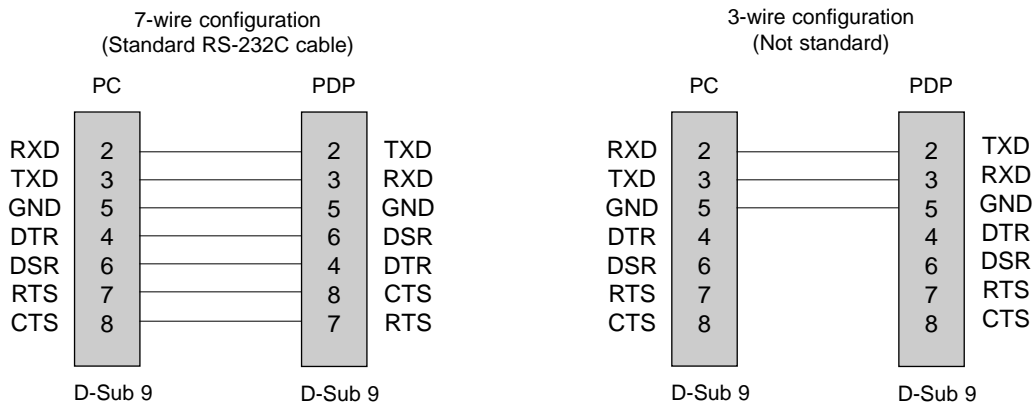
- Connect the RS-232C input jack to an external control device (such as a computer) and software upgrade.

### Type of connector; D-Sub 9-pin male

| No. | Pin name             |
|-----|----------------------|
| 1   | No connection        |
| 2   | RXD (Receive data)   |
| 3   | TXD (Transmit data)  |
| 4   | DTR (DTE side ready) |
| 5   | GND                  |
| 6   | DSR (DCE side ready) |
| 7   | RTS (Ready to send)  |
| 8   | CTS (Clear to send)  |
| 9   | No Connection        |



### RS-232C configurations



## Software upgrade Process

- Power Switch OFF.
- Connect the serial port of the control device to the RS-232 jack on the LCD-TV back panel.  
RS-232C connection cables are not supplied with the LCD-TV.
- Power Switch ON. The power indicator on the front of the panel should now display red, means that the LCD-TV is in standby mode.
- Copy the software (MTKTOOL) to the computer.
- Open the software (MTKTOOL.EXE)
- Select MTK 8205 and Point "browse" on the interface of the MTKTOOL.exe.
- Select the file which will be update.
- Point "update" on the interface of the MTKTOOL.exe.
- Waiting for the upgrader programing, when it is finished, the bar will display 100%.
- After the upgrader is finished, shut down the power switch, take out the RS-232C connection after the power indicator is extinguished.

Note: After upgrading, the first time of power on will be some long.